MEDICAL LIBRARY

This Issue Exceeds 92,000 Copies

THE JOURNAL

OF THE

American Medical Association

Subscription, $7.00 — PUBLISHED WEEKLY — Single Copies, 25 Cents

VOLUME 106, No. 5 — 535 North Dearborn Street, CHICAGO, ILL. — FEBRUARY 1, 1936

CONTENTS AND SUBJECT INDEX

The Autonomic Nervous System: Essential Anatomy. Albert Kuntz, M.D., St. Louis.....345

The Rôle of the Autonomic Nervous System in the Production of Pain. Loyal Davis, M.D., and Lewis J. Pollock, M.D., Chicago.....350

Clinical Tests of Function of the Autonomic Nervous System. G. E. Brown, M.D., Rochester, Minn..353

Essential Pharmacology of the Autonomic Nervous System. D. E. Jackson, M.D., Cincinnati.....357

Indications for Operations on the Sympathetic Nervous System. A. W. Adson, M.D., Rochester, Minn. 360

Papers of Drs. Kuntz, Davis and Pollock, Brown, Jackson and Adson discussed by Drs. Scott, Wright, White, Jones, Greene, Kuntz, Brown and Adson.

Asbestosis. A. J. Lanza, M.D., New York 368

Biologic Effects of Pineal Extract (Hanson): Amplification of Effects in the Young Resulting from the Treatment of Successive Generations of Parent Rats. L. G. Rowntree, M.D.; J. H. Clark, M.D.; Arthur Steinberg, B.S., Philadelphia, and A. M. Hanson, M.D., Faribault, Minn.....370

Discussed by Drs. Hoskins and Rowntree.

CLINICAL NOTES, SUGGESTIONS AND NEW INSTRUMENTS

Abdominal Apoplexy: Fatal Intraperitoneal Hemorrhage Due to Spontaneous Rupture of a Visceral Artery. M. T. Moorehead, M.D., Tuscaloosa, Ala., and J. S. McLester, M.D., Birmingham, Ala...373

Glycosuria Caused by Administration of Antuitrin-S for Bilateral Undescended Testes. Harry Koplin, M.D., Los Angeles.....374

THERAPEUTICS

The Therapy of the Cook County Hospital: Coughs. Edited by Bernard Fantus, M.D., Chicago....375

COUNCIL ON PHARMACY AND CHEMISTRY 382

COMMITTEE ON FOODS 383

EDITORIALS

Mechanism of Calcification.....384

The Hospital and Medical Education 384

Etiology and Treatment of Sprue.385

CURRENT COMMENT

How Cars Go Out of Control....386

Recurrence in Acute Infectious Diseases of Childhood.....386

COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

The Recent Graduate and Drug Nihilism. Norman A. David, M.D., Cincinnati 405

BUREAU OF LEGAL MEDICINE AND LEGISLATION 410

(Subject Index on next page)

ASSOCIATION NEWS 387

A.M.A. CONVENTION • KANSAS CITY, MO. • MAY 11-15, 1936

new book—STOMACH & DUODENUM

BRAND NEW . . . published scarcely two months when it had to go back to press for another large printing! That is the striking record of this *clinical book* by George B. Eusterman, Donald C. Balfour and their Associates at The Mayo Clinic.

Even only a brief examination of this book will reveal at once the reasons for this success. First of all the book was written to fill the *specific needs of the Family Physician* as well as those of the Surgeon and the Specialist. It is, therefore, *highly clinical*—from beginning to end. It lays particular stress on those diseases of most frequent occurrence in general practice. It gives the diagnostic significance of the important symptoms. It interprets laboratory findings in terms of the bedside. It details treatment, gives diets, and tells and *shows* operative technic step-by-step. It has a particularly fine chapter of 97 pages on duodenal ulcer, another of 71 pages on gastric ulcer, 22 pages on gastritis, 73 pages on carcinoma, 20 pages on hemorrhage, 50 pages with 80 skiagrams on roentgenologic diagnosis. And so it goes—all through the entire 958 pages.

There are *571 illustrations on 436 figures.* Not just pictures, mind you, but illustrations that *actually instruct,* help interpret symptoms, guide in operative technic.

Details in SAUNDERS ADVERTISEMENT—Page 3

SUBJECT INDEX TO THIS ISSUE

The letters used to explain in which department the matter indexed appears are as follows: The Star (*) indicates an Original Article; "ab," abstract; "E," Editorial; "C," Correspondence; "Ml," Medicolegal; "ME," Medical Economics.

Abdomen, apoplexy; fatal intraperitoneal hemorrhage *373
supports in pulmonary tuberculosis....ab-417
Abscesses, pararenal, metastatic.....ab-426
Addison's Disease, adrenal cortex extract effect on sodium chloride metabolism in ab-414
Wilson's adrenal cortex extract in.....ab-415
Advertising: dental, for services.....Ml-410
Amputation, painful stumps, sympathectomy in *364
Anemia, pernicious, and myxedema.....ab-426
Anesthetics, grant for study of.....390
Angioneurosis, pituitary extract for.....ab-424
Antuitrin-S causes glycosuria.....*374
Arthritis, chronic, life expectancy in.....ab-420
chronic, operations on sympathetic.....*362
chronic, symposium on 387
Association News.....387
Automobiles, how cars go out of control..E-386
Aviation, Association for Protection Against Aerial Warfare 396
Bacterids, pustular, of hands and feet....ab-418
Bacteriologists, Society of Illinois Bacteriologists 387
Ballin, Max, memorial lectures.....388
Blood chemistry and count of dog.....402
count, effects of aminopyrine and phenobarbital on ab-420
flow through skeletal muscle.....ab-422
pressure, erythrocyte relation to.....ab-421
pressure, high, essential, pregnancy in.ab-425
pressure, high, essential, sympathectomy in *364
pressure, systemic, reactability.....*354
transfusion in diphtheria.....ab-425
transfusion, uremia from.....ab-416
urea nitrogen by direct nesslerization...ab-421
vessels, peripheral disease, sympathectomy for *360
Board Examinations.....407
Bone graft eventually becomes rarefied.....392
Book Notices.....408
Books Received.....**Adv. Page 32**
Brain tumors, mesencephalic glioma.....ab-419
tumors, sedimentation reaction in.....ab-426
Breast, effect of estrogenic substance ointment ab-423
Buchanan, J. J., honored.....390
Bureau of Legal Medicine and Legislation..410
Calcification 392
mechanism E-384
Calcium phosphate with phenobarbital, improved sedative due.....ab-419
California Medical Association Day at San Diego Fair 387
Cancer, von Brehmer's Siphonospora polymorpha as cause of.....394
survey, Illinois 387
Central Society for Clinical Research.....412
Chancroid antigen; dmelcos vaccine.....404
Cherry, syrup of, formula for.....404
Children, International Congress for Protection of 397
school, classified by handwriting speed factor ab-419
Coitus during gonorrheal prostatitis.....403
Committee on Foods.....383
Congress, U. S., medical bills in.....387; 391
Conjunctivitis, caused by sensitivity to yellow mercuric oxide.....404
Connaught Laboratories western division at Vancouver 391
Cornea dystrophy 404
Cornell Clinic E-384
Correspondence 400
Coughs, treatment at Cook County.....*375
Council on Medical Education and Hospitals.405
Council on Pharmacy and Chemistry.....382
Cumming, Hugh S., Surgeon General, retires.391
Deaths 398
Diabetes Mellitus, treatment, conditioned Stolte's free diet.....ab-424
treatment, pancreotoxin ab-426
Diarrhea of hyperthyroid origin.....ab-424
Diets, modern, deficiencies.....392
Diphtheria, transfusion in.....ab-425
toxoid, no paralysis after.....403
District of Columbia Dental Clinic.....391
Dog, blood count and blood chemistry of....402
homeless, and echinococcus.....396
Drugs nihilism, recent graduate and.....*405
Echinococcosis and homeless dogs.....396
Embolectomy, pulmonary, technic.....ab-420
Embolism, postoperative, pulmonary.....396
Empyema, tuberculous, double thiosulfate of sodium and gold intrapleurally.....ab-423
Erythrocyte; relation to blood pressure...ab-421
Estrogenic Substance ointment.....ab-423
Evans, Griffith, death.....392
Extremities, spastic lesions, sympathectomy in *363
Fellowships, research, available, U. of Oklahoma 389
Filariasis 404
Food allergy, thrombocytopenia due to...ab-412
protective 393
residues (indigestible), rôle in laxation.ab-412
Foot, pustular bacterids.....ab-418
Foreign Letters.....392
Fracture, union; calcifications.....392
Glioma, mesencephalic ab-419
Glycosuria from antuitrin-S.....*374
Gonorrhea prostatitis, sexual intercourse in..403
Government Services.....391
Graduates, recent, and drug nihilism.....*405
Growth, effects of pineal extract (Hanson).*370
Gynecology, Congress of German Society....394
Hands, pustular bacterids.....ab-418
Hay Fever, serologic evidence of immunity ab-419
Health at Washington, D. C.....387
county unit, new, Mississippi.....389
unit, full time, Alabama.....387
Heart disease, value of walking down stairs C-401
electrocardiography in stab wound of..ab-420
function test, exercise tolerance....*355; *356
murmurs, use of oscillographs.....404
Hemophilia, tonsillectomy in.....404
Heptene, β methyl ζ-methylamino-β-γ-heptene, effect on blood pressure and stomach *359
Hospitals and medical education.....E-384
clinics at Central Maine General, Lewiston, Me. 388
new women's unit at Harlem.....389
private, in distress, France.....393
Hyperthyroidism, diarrhea of.....ab-424
Immunity, serologic evidence.....ab-419
Infants, New-Born, dimensions at birth.....401
Infectious Diseases, acute, recurrence....E-386
Intestine, large, diffuse polyposis.....ab-426
Kidney disease, acacia for.....ab-416
function, ferrocyanide excretion test...ab-415
potassium salts excretion by.....ab-415
Licensure, all diplomas to be revised, France.393
Life, exhibit of.....390
Liver, question of pregnancy and.....394
Lung conditions, differential diagnosis.....402
cysts and tumors.....395
nontuberculous disease with positive tuberculin reactions ab-417
McQuiggan, P. F., to act as coordinator....388
Malpractice: burns; hot water from upset sterilizer Ml-411
drainage tubes; accidentally left in patient Ml-410
eye; failure to remove steel particle...Ml-410
sponges; accidentally left in patient....Ml-411
Marriage, examination before.....397
Marriages 398
Medical Education and hospital.....E-384
graduate course at Ames, Ia.....387
Philadelphia county graduate institute.....390
Medical Examinations and Licensure.....407
Medical Service, prepaid, subject to insurance laws 390
Medicolegal 410
Meetings, Coming Meetings.....412
Meningitis, outbreaks 391
Menstruation, safe period.....394
Mercury, diuretic properties of new compounds ab-416
sensitivity to yellow mercuric oxide.....404
Milk, human, depot, Berlin.....395
Morandi, J. E. S. C., sentenced.....387
Muscle, skeletal, blood flow through.....ab-422
Myxedema and pernicious anemia.....ab-426
Nervous System, autonomic, clinical function tests *353
autonomic, essential anatomy.....*345
autonomic, essential pharmacology.....*357
autonomic, rôle in producing pain.....*350
sympathetic *345
sympathetic, surgery, indications.....*360
Neuroma, painful, sympathectomy in.....*364
New and Nonofficial Remedies.....382
News 387
Northwest Regional Conference.....391
Nutrition, lectures on, government control, Germany 395
Oscillographs, use of.....404
Osteoporosis, sympathectomy in.....*363
Pain, production, rôle of autonomic nervous system *350
Pancreas, insular emaciation.....ab-424
Paralysis, none after diphtheria toxoid.....403
Pediatrics, need of, in physicians training..397
Pelvis, noncalculous obstruction.....ab-418
Peptic Ulcer, jejunal.....ab-418
Marks precipitin test of activity.....ab-412
rôle of spine curvature in.....ab-425
surgery, gastric acidity after.....ab-413
Pericarditis, chronic mediastinal.....396
suppurative, posterior drainage in.....ab-417
Pharmacology, essential, of autonomic nervous system *357
Phenobarbital with calcium, improved sedative ab-419
Phlebitis, prevention, in gynecologic operations ab-423
Phosphate ions, concentration, factor in calcification E-384
Physicians', new edition of guide for.....397
tax on, France 393
U. S. Public Health Service needs.....391
Pineal Extract (Hanson), biologic effects..*370
Pneumoconiosis, asbestosis *368
Poliomyelitis, sympathectomy *363
Polozker Memorial Lecture.....388
Posture, effect on blood pressure....*354; *356
Potassium salts, action; renal excretion..ab-415
Pregnancy in essential hypertension.....ab-425
prenatal clinics in evening, Chicago.....387
question of liver and.....394
syphilis in, treatment.....403
Proprietaries and recent graduates.....*405
Psoriasis, cevitamic acid in.....ab-423
Publicity, resolution on.....389
Purpura, thrombocytopenia from food allergy ab-412
Queries and Minor Notes.....401
Radiation therapy 392
Radio Broadcasts.....387
Radiology, ninth annual Congress.....392
Rats, crusade against, Amsterdam.....396
Raynaud's Disease, sympathectomy in.....*361
Red Cross in the Belgian Congo.....397
Reflex, self-righting; how cars go out of control E-386
Roentgen Ray films, ownership.....C-400
Rosenau, M. J., appointment at University of North Carolina 389
Scleroderma, sympathectomy *361
Sclerosis, multiple: effect of typhoid vaccine and epinephrine on blood coagulation..ab-419
Septicopyemias due to B. funduliformis..ab-426
Sigmoid cancer, resection for.....ab-422
Smallpox, signs of immunity; vaccination after exposure 401
Society Proceedings.....412
Spine, curvature, rôle in gastroduodenal ulcer ab-425
Sprue, etiology; treatment.....E-385
Stairs, walking down, in heart disease....C-401
Staphylococcus infections of skin, copper sulfate for ab-423
State Board Examinations.....407
State Board examinations, partial subject averages for *406
Sterility, problem of.....394
Stomach acidity after operations for gastric and duodenal ulcer.....ab-413
motility, effect of splanchnic resection and vagotomy ab-413
Strain (Over-Exertion): ulcer, gastric; perforation attributed to.....Ml-411
Surgery, National Congress, Italy.....395
Seattle Society, silver anniversary.....390
Sweating, essential hyperhidrosis, sympathectomy *362
studying function *354; *355
Sympathectomy, indications *360
Syphilis, prevention by bismuth intramuscularly in prostitutes 393
treatment 403
treatment, mapharsen ab-418
Syrup cerasiae, formula.....404
Tax on professions.....393
Testes, undescended, glycosuria after giving antuitrin-S *374
Therapy of Cook County Hospital.....*375
Thrombo-angiitis obliterans, sympathectomy in *362
Thrombosis 396
Tongue, burning of.....403
Tonics and Sedatives.....**Adv. Page 26**
Tonsillectomy in hemophilia.....404
Tuberculosis, prophylaxis 397
Pennsylvania Society 389
pulmonary, abdominal compression in..ab-417
Tumors, measurement of nuclei and counting of chromosomes in.....ab-425
Ulcers, trophic, sympathectomy in.....*364
Urea clearance, excretion of ferrocyanide in relation to ab-415
Uremia from transfusion.....ab-416
Ureters, noncalculous obstruction.....ab-418
Uterus, cervical metritis, electrocoagulation for ab-423
Vasoconstriction, measurement.*353; *354; *355
Walking down stairs in heart disease.....C-401
Whooping Cough, blood counts in.....ab-422

THE JOURNAL of the American Medical Association is published weekly by the American Medical Association, 535 North Dearborn Street, Chicago, Ill. Subscription price, $7.00 a year. 25c a copy. Canadian $8.50. Foreign $11.00. Entered as second class matter June 25, 1885, at the Postoffice at Chicago, Ill., under Act of March 3, 1879.

Volume 106. No. 5. *Copyright 1936 by the American Medical Association.*

The Journal of the American Medical Association

Published Under the Auspices of the Board of Trustees

VOL. 106, No. 5 CHICAGO, ILLINOIS FEBRUARY 1, 1936

THE AUTONOMIC NERVOUS SYSTEM

ESSENTIAL ANATOMY

ALBERT KUNTZ, M.D.

ST. LOUIS

The autonomic nervous system consists of the ganglions that are anatomically and functionally connected with the central nervous system through the visceral efferent components of the cerebral and spinal nerves, and the nerves that arise in these ganglions (fig. 1). Afferent cerebrospinal nerve components, both somatic and visceral, are functionally associated with the autonomic nerves. These, however, are not regarded as part of the autonomic nervous system, since they are essential components of the cerebrospinal nerves. The peripheral visceral efferent conduction pathway consists of two neurons, a visceral efferent cerebrospinal nerve component and an autonomic neuron; the former may be designated the preganglionic, the latter the ganglionic neuron. On the basis of the distribution of the preganglionic neurons in the central nervous system, the autonomic nervous system may be divided into (1) the cranial division, which is connected with the brain stem through preganglionic components of the third, seventh, ninth, tenth and eleventh cranial nerves, (2) the thoracolumbar division, which is connected with the spinal cord through preganglionic components of the thoracic and first and second lumbar spinal nerves, and (3) the sacral division, which is connected with the spinal cord through preganglionic components of the second, third and fourth sacral nerves.

The preganglionic components of the thoracic and upper lumbar nerves join the sympathetic trunk through the white communicating rami and terminate either in the ganglions of the sympathetic trunk or in sympathetic ganglions located in closer proximity to the abdominal viscera; viz., the prevertebral ganglions; those of the cranial and sacral nerves do not join the sympathetic trunk but run directly to the peripheral ganglions, in which they terminate. The cranial and sacral divisions of the autonomic system, therefore, are comparable to each other but differ from the thoracolumbar division with respect to their preganglionic connections. They also differ from the thoracolumbar division in their reactions to certain drugs; e. g., epinephrine and atropine. On the basis of these anatomic and physiologic peculiarities, the cranial and sacral divisions have been designated the craniosacral autonomic system, and the thoracolumbar division the thoracolumbar autonomic system. The former constitutes the parasympathetic system, the latter the sympathetic system, according to the current usage of these terms. The parasympathetic system comprises the cranial autonomic ganglions and all the autonomic ganglions associated with the thoracic, abdominal and pelvic viscera, which are connected with the central nervous system through preganglionic components of the vagus and sacral nerves, and all the nerve fibers arising in these ganglions. The sympathetic system comprises the sympathetic trunk ganglions and the ganglions in the celiac and other abdominal and pelvic plexuses that are connected with the central nervous system through preganglionic components of the splanchnic nerves and all the nerve fibers arising in these ganglions. The preganglionic neurons that connect the ganglions in the walls of the enteric canal with the central nervous system are components of the vagus and sacral nerves. These ganglions, consequently, are related to the parasympathetic system. Many of their neurons, however, are not related to preganglionic neurons by direct synaptic connections but are components of local reflex arcs. The enteric plexuses differ in this respect from other divisions of the autonomic nervous system, wherefore Langley designated them the enteric nervous system.

THE SYMPATHETIC SYSTEM

The sympathetic system, consisting of the sympathetic trunks and the nerves arising from them and the sympathetic plexuses and nerves associated with the abdominal and pelvic viscera, is distributed widely throughout the body. Each sympathetic trunk, made up of a series of ganglions (vertebral ganglions) connected by longitudinal fibers, extends along the ventrolateral aspect of the vertebral column from the base of the skull to the coccyx. The cervical portion includes three ganglions, the superior, middle (sometimes absent) and inferior cervical sympathetic ganglions. Not infrequently the ganglion of the first thoracic segment is fused with the inferior cervical ganglion, forming a stellate ganglion. Below this level the ganglions in general are arranged segmentally. All the ganglions of the sympathetic trunk are connected with the spinal cord through preganglionic spinal nerve components. Since the latter are limited to the thoracic and first and second lumbar nerves, most of those which terminate in the cervical ganglions must run upward in the sympathetic trunk and those which terminate in the ganglions below the second lumbar segment must traverse the sympathetic trunk downward. Many of the preganglionic components of the splanchnic nerves also traverse the sympathetic trunk through one or more segments. The interganglionic rami of the sympathetic trunk consist mainly of these preganglionic fibers and visceral afferent fibers. Most of the visceral afferent fibers that traverse the sympathetic trunks supply visceral organs. A limited number rejoin the spinal nerves for peripheral distribution.

From the St. Louis University School of Medicine.

Read before the Section on Pathology and Physiology at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

The sympathetic trunk is connected with all the spinal nerves through communicating rami. Those connected with the thoracic and first and second lumbar nerves include both the visceral components of the nerves in question and the sympathetic fibers that join these nerves for peripheral distribution. Those connected with the remaining spinal nerves contain mainly sympathetic fibers. Most of the spinal nerve components which traverse the communicating rami are myelinated; most of the sympathetic fibers are either unmyelinated or only thinly myelinated. The spinal nerve components, consequently, constitute the white and the sympathetic fibers the gray communicating rami.

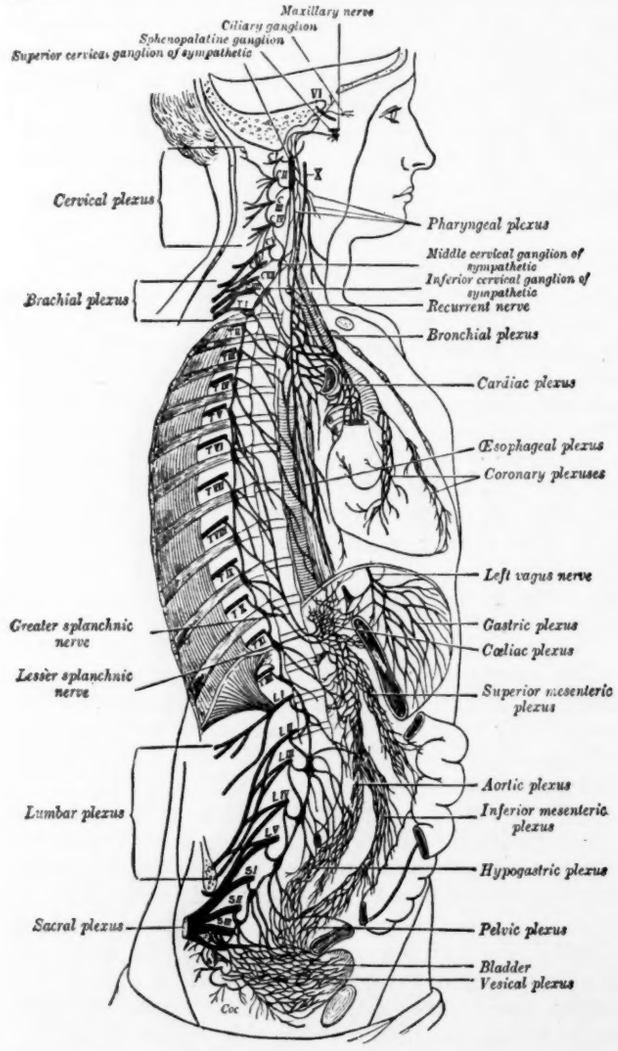


Fig. 1.—Diagram illustrating the general distribution of the autonomic nervous system and the connections of the right sympathetic trunk with the thoracic, abdominal and pelvic plexuses. (Used as figure 140, page 245, in Kuntz, Albert: Text-Book of Neuro-Anatomy, Philadelphia, Lea & Febiger Company, 1931, by permission of Lea & Febiger Company, publishers of Gray's Anatomy.)

The sympathetic fibers that join the spinal nerves are distributed to all the tissues requiring autonomic innervation within the areas of distribution of the respective nerves. The thoracic viscera are supplied with sympathetic fibers through nerves arising from the cervical and thoracic segments of the sympathetic trunks. The abdominal and pelvic viscera are supplied with sympathetic fibers through nerves arising from the ganglionated plexuses in the abdomen and pelvis, the ganglion cells of which are synaptically connected with preganglionic components of the thoracic and lumbar splanchnic nerves. The cephalic area is supplied with sympathetic fibers, most of which arise in the superior cervical sympathetic ganglion and traverse the plexuses on the internal and external carotid arteries. Some fibers arising in the middle and inferior cervical ganglions also reach the cephalic area by way of the plexuses on the vertebral arteries.

THE PARASYMPATHETIC SYSTEM

The parasympathetic system includes the cephalic autonomic ganglions, with the nerves arising from them, and all the ganglions associated with the visceral organs, which are connected with the central nervous system through preganglionic components of the vagus and sacral nerves, and the nerves arising from these ganglions. The parasympathetic system, therefore, is less widely distributed in the body than the sympathetic system. Despite the reported observations of certain investigators, which have been interpreted as indicating the existence of parasympathetic fibers in the posterior spinal nerve roots, there are no data available proving the existence of parasympathetic fibers in the areas of distribution of the somatic rami of the spinal nerves.

The preganglionic neurons that connect the cephalic parasympathetic ganglions with the brain stem are components of the third, seventh and ninth cranial nerves. Those which terminate in the ciliary ganglion constitute the visceral efferent group (Edinger-Westphal nucleus) associated with the nucleus of the oculomotor nerve. Their axons reach the ganglion by way of the oculomotor nerve. Those which terminate in the sphenopalatine ganglion are components of the facial nerve, the cell bodies of which are located in the superior salivatory nucleus. They traverse the greater superficial petrosal nerve and the nerve of the pterygoid canal, through which they reach the ganglion. Those which terminate in the otic ganglion are components of the glossopharyngeal nerve, the cell bodies of which are located in the inferior salivatory nucleus. They reach the ganglion by way of the lesser superficial petrosal nerve. Those which terminate in the submaxillary ganglion also are components of the facial nerve, the cell bodies of which are located in the superior salivatory nucleus. They reach the ganglion by way of the chorda tympani and the lingual nerve. Preganglionic components of the glossopharyngeal nerve, the cell bodies of which are located in the inferior salivatory nucleus, also terminate in numerous small ganglions within the area of distribution of the glossopharyngeal nerve in the tongue.

The parasympathetic ganglions associated with the thoracic and abdominal viscera are connected with the brain stem through preganglionic components of the vagus nerves. Those associated with the pelvic viscera are connected with the spinal cord through preganglionic components of the sacral nerves. The fibers arising in these ganglions are distributed mainly to the viscera with which the respective ganglions are associated. The visceral organs, therefore, are innervated both through the parasympathetic and through the sympathetic nerves (fig. 2).

RATIO OF GANGLIONIC TO PREGANGLIONIC NEURONS

The neurons in the autonomic ganglions greatly exceed in numbers the preganglionic fibers; consequently, a single preganglionic fiber must effect synaptic connections with more than one autonomic neuron. By carefully executed actual counts, Billingsley and Ranson found the ratio of the neurons in the superior

cervical sympathetic ganglion to the preganglionic fibers that enter this ganglion to be approximately 32 to 1.[1] This finding warrants neither the conclusion that the same ratio obtains throughout the autonomic nervous system nor the conclusion that a single preganglionic fiber actually terminates in synaptic relationship to approximately thirty-two neurons in the superior cervical ganglion. Terminations of collaterals arising from the proximal portion of the axon of one neuron in synaptic relationship to adjacent neurons in the superior cervical ganglion have been described.[2] Such connections would make actual synaptic contact of preganglionic fibers with all the neurons in the ganglion unnecessary. On the other hand, some preganglionic fibers that terminate in this ganglion also effect synaptic connections through collaterals in the middle and inferior cervical ganglions. Comparable anatomic relationships probably obtain also in other autonomic ganglions. The ratio of the neurons in a given ganglion to the preganglionic fibers that enter it, consequently, cannot be regarded as an exact criterion of the number of ganglion cells that may be activated by impulses conducted through single preganglionic fibers. The excess in the number of ganglionic neurons over the number of preganglionic fibers, nevertheless, must be regarded as a factor in the relatively widespread responses to reflex stimulation of the autonomic nerves. The responses to parasympathetic stimulation in general are more definitely circumscribed than those to sympathetic stimulation. This does not warrant the conclusion that single preganglionic neurons effect synaptic connections with fewer ganglion cells in the parasympathetic ganglions than in the sympathetic but is to be explained on the basis of the relative stability of the respective chemical mediators liberated at the periphery by parasympathetic and sympathetic stimulation. The parasympathetic mediator (parasympathin) is effective only at the site of liberation, whereas the effectiveness of the sympathetic mediator (sympathin) is not limited to the site of liberation.

CENTRAL AUTONOMIC CENTERS AND CONDUCTION PATHWAYS

In addition to the aggregates of visceral efferent neurons in the spinal cord and brain stem through which the autonomic ganglions are anatomically and functionally connected with the central nervous system, there exist still other aggregates of neurons, particularly in the medulla oblongata and the diencephalon, which are functionally related to the autonomic nervous system. For want of more appropriate designations, these have been called central autonomic centers. They do not constitute circumscribed anatomic entities but have been delimited mainly by physiologic methods. The medulla oblongata contains at least three well known centers of this kind; viz., the vasomotor center, located in the substantia reticularis grisea in the upper part of the medulla; the center for the regulation of carbohydrate metabolism, located in the floor of the fourth ventricle just below the middle of the brachium pontis, and the respiratory center, located about the level of the inferior apex of the fourth ventricle. The diencephalic autonomic centers are located mainly in the hypothalamus and the walls of the third ventricle. The diencephalic autonomic centers, as indicated by the results of recent studies reported by Ranson and his associates,[3] are essentially related to the sympathetic system. They involve the major portion of the hypothalamus and extend forward as far as the optic chiasm but not beyond this point. In the preoptic region just in front of the hypothalamus, according to their observations, there exists a center which is essentially related to the parasympathetic system. Stimulation of this center elicits parasympathetic responses particularly of the urinary bladder and the respiratory system.

The results of recent experimental studies, both physiologic and anatomic, support the assumption that the cerebral cortex also exerts an influence on visceral functions, but the mechanisms through which this influence is exerted as yet are not fully known. Mettler[4] has traced degenerated fibers of small caliber from the cortex into intimate relation to the peri-

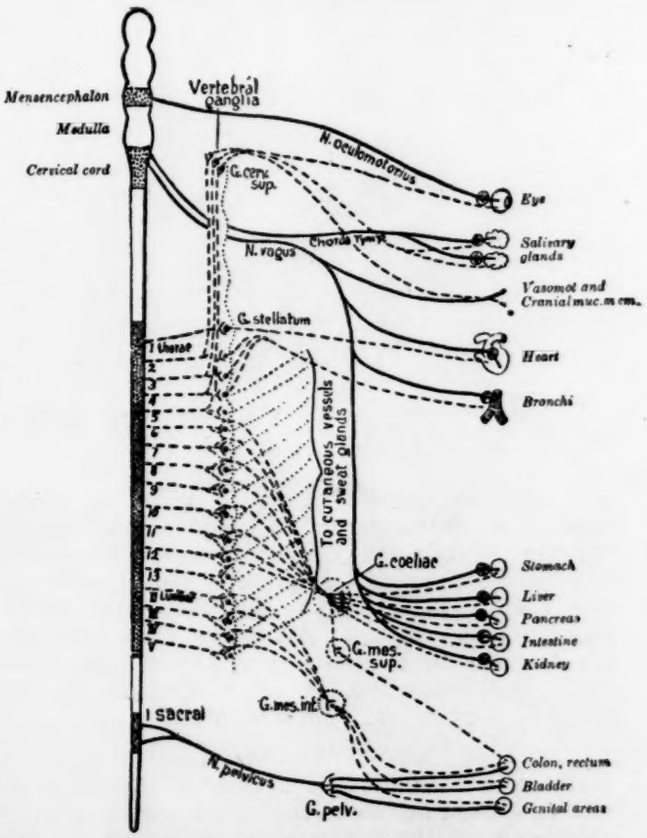


Fig. 2.—Diagram of the autonomic nervous system. The solid black lines represent the cranial and sacral divisions; the broken lines represent the thoracolumbar division. (Used as figure 139, page 241, in Kuntz: Text-Book of Neuro-Anatomy, modified from Meyer and Gottlieb.)

ventricular system in primates following cortical lesions in the premotor and prefrontal areas, and into the lateral hypothalamic nuclei, following cortical lesions in the parietal area. The Hoffs[5] also have traced degenerated fibers of cortical origin into the spinal cord following cortical lesions in the premotor area.

The descending conduction pathways through which impulses emanating from the higher autonomic centers reach the visceral efferent nuclei in the brain stem and spinal cord as yet are not fully known. Those arising in the diencephalon involve both the periventricular

1. Billingsley, P. R., and Ranson, S. W.: On the Number of Nerve Cells in the Ganglion Cervicale Superius and the Nerve Fibers in the Cephalic End of the Truncus Sympatheticus in the Cat and on the Numerical Relations of Preganglionic and Postganglionic Neurons, J. Comp. Neurol. **29**: 359-366, 1918.
2. Lawrentjew, B. J.: Zur Morphologie des Ganglion cervicale superius, Anat. Anz. **62**: 529-539, 1924.
3. Ranson, S. W.; Kabat, H., and Magoun, H. W.: Autonomic Responses to Electrical Stimulation of the Hypothalamus, Preoptic Region and Septum, Arch. Neurol. & Psychiat. **33**: 467-477 (March) 1935.
4. Mettler, F. A.: Corticifugal Fiber Connections of Macaca Mulatta: A Summary of the Descending Pathways, Anat. Rev. **61**: 34 (March 25, supp.) 1935.
5. Hoff, C. E., and Hoff, H. E.: Spinal Terminations of the Projection Fibers from the Motor Cortex of Primates, Brain **57**: 454-474 (Dec.) 1934.

system and fibers that descend by a more direct course. The latter lie widely scattered in the ventral and medial portions of the cross section in the lower levels of the diencephalon.[6] Some terminate in the reticular formation; others extend directly into the spinal cord.[7] Of those which terminate in the reticular formation, some effect connections with the reticulospinal tracts; [8] others

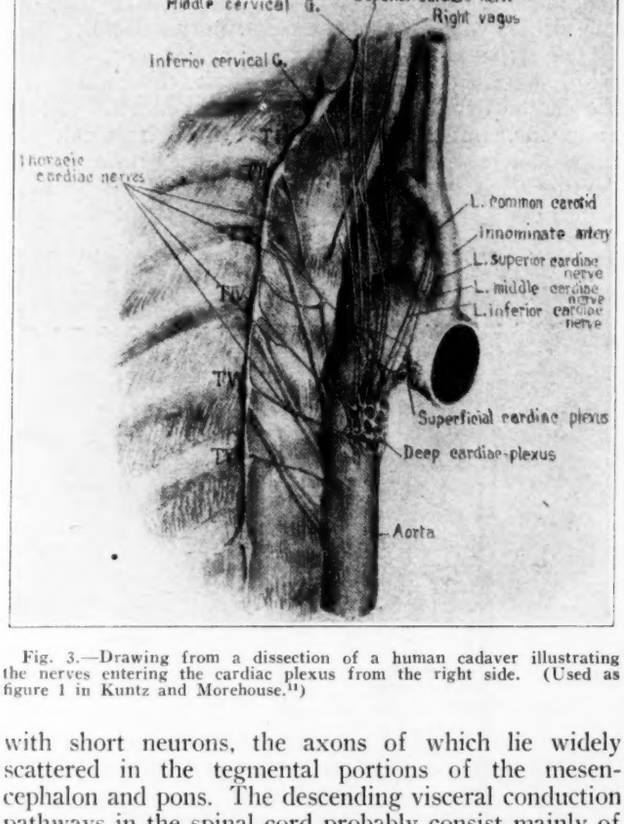


Fig. 3.—Drawing from a dissection of a human cadaver illustrating the nerves entering the cardiac plexus from the right side. (Used as figure 1 in Kuntz and Morehouse.[11])

with short neurons, the axons of which lie widely scattered in the tegmental portions of the mesencephalon and pons. The descending visceral conduction pathways in the spinal cord probably consist mainly of short neurons with frequent relays in the gray matter. Some of these neurons, furthermore, cross from one side to the other; consequently, visceral conduction takes place bilaterally, but more effectively on the ipsilateral than on the contralateral side.

VISCERAL REFLEX ARCS

The autonomic nervous system is essentially an efferent system, but both visceral and somatic afferent components of the cerebrospinal nerves effect reflex connections with the visceral efferent neurons in the spinal cord and brain stem. The afferent spinal nerve components that effect such connections in the spinal cord do not terminate in the visceral efferent (intermediolateral) cell column but in relation to neurons in the adjacent gray matter, which send their short axons into the visceral efferent column.[9] The afferent components of the cranial nerves that effect reflex connections with visceral efferent neurons in the brain stem likewise terminate in the respective afferent nuclei in relation to neurons the short axons of which terminate in the visceral efferent nuclei in question.

6. Isenschmid, R., and Schnitzler, W.: Beitrag zur Lokalisation des der Wärmeregulation vorstehenden Zentralapparates in Zwischenhirn, Arch. f. exper. Path. u. Pharmakol. **76:** 202-223, 1914.

7. Beattie, J.; Brow, R. G., and Long, C. N. H.: Physiological and Anatomical Evidence for the Existence of Nerve Tracts Connecting the Hypothalamus with Spinal Sympathetic Centers, Proc. Roy. Soc., s. B, **106:** 253-275 (May 3) 1930.

8. Allen, W. F.: Formatio Reticularis and Reticulospinal Tracts, Their Visceral Functions and Possible Relationship to Tonicity and Clonic Contractions, J. Washington Acad. Sc. **22:** 16-17, 1932.

9. Foerster, O.; Gagel, O., and Sheehan, D.: Veränderungen an den Endösen im Rückenmark des Affen nach Hinterwurzeldurchschneidung, Ztschr. f. Anat. u. Entwcklngsgesch. **101:** 553-565, 1933.

Most of the peripheral nerves, both visceral and somatic, include both cerebrospinal and autonomic nerve fibers. For example, the somatic rami of all the spinal nerves include sympathetic fibers, which join them directly from the sympathetic trunks by way of the gray communicating rami. The cerebrospinal nerve components included in the visceral nerves consist of preganglionic visceral efferent and visceral afferent neurons. The latter constitute the only conduction pathways through which impulses of visceral origin reach the central nervous system. They not only represent the afferent limbs of visceral reflex arcs but also effect central connections through which visceral impulses may be conducted to higher centers.

THE ANATOMIC BASIS OF SURGERY INVOLVING AUTONOMIC NERVES

Surgery involving autonomic nerves has become a recognized procedure in the treatment of various diseases, particularly angina pectoris, congenital megacolon and disorders in which circulatory disturbances in the extremities are factors, and in the relief of certain intractable pains. Such surgery implies exact knowledge of the anatomic relationships of the nerves in question. Failure to achieve the anticipated results of surgical intervention in certain cases, furthermore, has stimulated more exact anatomic studies. The results of only a few of these can be cited in the present connection.

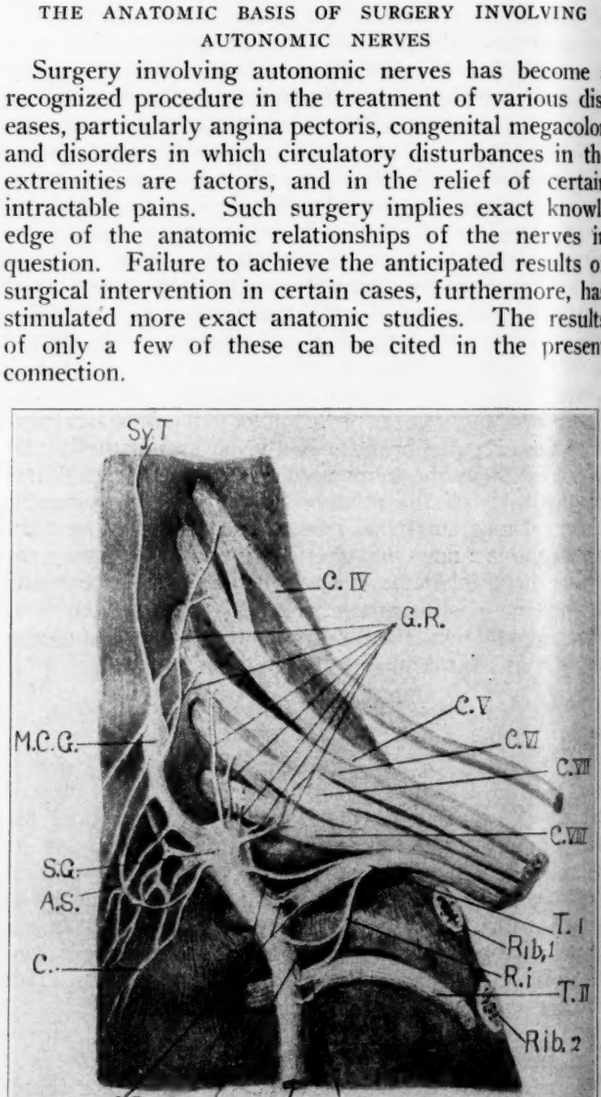


Fig. 4.—Drawing from the cadaver to illustrate the inconstant intrathoracic ramus from the second to the first thoracic nerve and the communicating rami joining the brachial plexus. A. S., ansa subclavia; C., the cardiac nerves; C. IV to C. VIII, cervical nerves; C. R. I, communicating rami to first thoracic nerve; C. R. II, communicating rami to second thoracic nerve; G. R., gray communicating rami to cervical nerves; M. C. G., middle cervical ganglion; R. i, inconstant intrathoracic ramus from second to first thoracic ganglion; C. G., stellate ganglion; Sy. T., sympathetic trunk; X, sympathetic ramus joining the ramus from the second to the first thoracic nerve; T. I, first thoracic nerve; T. II, second thoracic nerve. (Used as figure 1 in Kuntz, Albert: Distribution of the Sympathetic Rami to the Brachial Plexus, Arch. Surg. **15:** 871 [Dec.] 1927.)

According to the current textbook accounts, the sympathetic innervation of the heart is derived from the superior, middle and inferior sympathetic cardiac

nerves, arising respectively from the superior, middle and inferior cervical sympathetic ganglions. Cardiac nerves arising from thoracic segments of the sympathetic trunks also have been described both in lower mammals [10] and in man.[11] These nerves vary in size and number but are constantly present in man. Nerves could be traced from the second and third thoracic ganglions of the sympathetic trunk directly into the cardiac plexus in all the cadavers used in our study. In some cases, small cardiac nerves also could be traced from the fourth and fifth thoracic segments of the sympathetic trunks (fig. 3). The thoracic cardiac nerves, like the middle and inferior cervical, include both sympathetic and visceral afferent fibers. The superior cervical sympathetic cardiac nerve probably includes no afferent components.

The bilateral distribution of the cardiac nerves is not symmetrical. The superficial cardiac plexus is made up mainly by the left superior sympathetic cardiac nerve and the inferior cervical cardiac branch of the left vagus. The deep cardiac plexus consists of two lateral parts joined together by numerous fiber bundles, but these two parts are unlike in composition and distribution. The right portion receives fibers by way of all the sympathetic cardiac nerves and all the vagus cardiac branches on the right side. The left portion receives fibers by way of the left middle and inferior cervical and thoracic sympathetic cardiac nerves and the superior cervical and thoracic cardiac branches of the left vagus.

The right, or anterior, coronary plexus is derived mainly from the right portion of the deep cardiac plexus; the left, or posterior, coronary plexus is derived mainly from the left portion of the deep cardiac plexus. Both coronary plexuses also receive fibers from the superficial cardiac plexus. According to Woollard,[12] the coronary arteries are supplied with both sympathetic and parasympathetic fibers, but their smaller branches and the arterioles are innervated mainly through parasympathetic fibers.

On the basis of these anatomic data it is evident that extirpation of only the superior cervical sympathetic ganglions effects the elimination of but a minor portion of the sympathetic innervation of the heart and leaves its afferent innervation intact. Extirpation of the entire cervical portions of the sympathetic trunks eliminates a greater portion of the sympathetic and a portion of the afferent cardiac innervation. Complete elimination of the sympathetic cardiac nerves, including the afferent spinal nerve components associated with them, would require extirpation of the inferior cervical and upper four or five thoracic segments of the sympathetic trunks.

The sympathetic fibers that innervate the peripheral blood vessels are conveyed peripherad in the somatic rami of the corresponding spinal nerves, branches of which join the vessels at intervals along their courses. Elimination of the vasomotor innervation of an extremity, therefore, requires interruption of all the sympathetic rami that join the nerves which supply it. This may be accomplished for the lower extremity by extirpation of the upper three or four lumbar segments of the sympathetic trunk. Complete sympathetic denervation of the upper extremity requires more extensive sympathetic section in some cases than in others. In some cases, no fibers emerging from the sympathetic trunk below the first thoracic segment join the nerves to the upper extremity. In a large percentage of cases, however, fibers that leave the sympathetic trunk in the second thoracic segment join the brachial plexus through an intrathoracic ramus of the second thoracic nerve, which joins the first proximal to the origin of the first intercostal nerve (fig. 4). Complete sympathetic denervation of the upper extremity, in these cases, by ganglionectomy requires extirpation of the

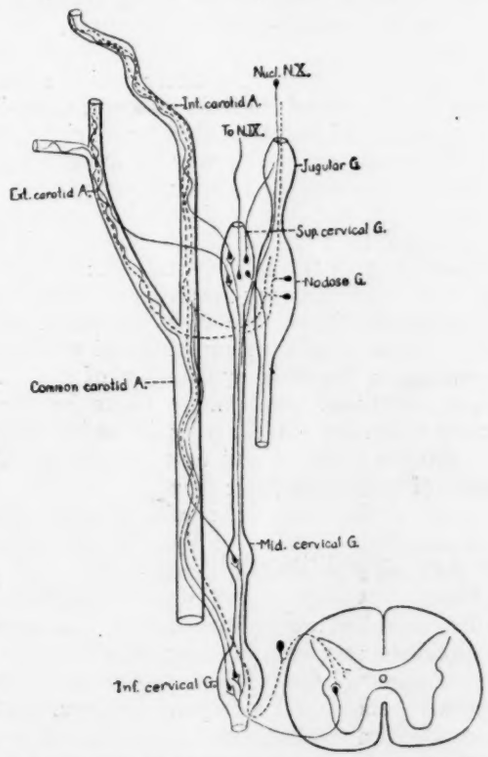


Fig. 5.—Diagrammatic representation of the anatomic relationships of the vagus and spinal nerve components which extend cephalad along the common, internal and external carotid arteries. (Used as figure 5 in Kuntz.[14])

inferior cervical ganglion and the first and second thoracic segments of the sympathetic trunk, including the second thoracic ganglion.

Certain cases have been reported in which the operative procedure suggested has failed completely to eliminate the sympathetic innervation of the upper extremity.[13] The observations reported in these cases suggest that sympathetic fibers may enter the upper extremity from sources other than the cervical and first and second thoracic segments of the sympathetic trunk. In view of the developmental and anatomic relationship of the thoracic and cervical portions of the sympathetic trunks, it has seemed more probable that such a source might be found below than above the level of the second thoracic segment. In the absence of an intrathoracic pathway through which sympathetic fibers arising below the second thoracic segment could enter the brachial plexus, following section of the sym-

10. Perman, E.: Anatomische Untersuchungen über die Herznerven bei den höhern Säugetieren und beim Menschen, Ztschr. f. d. ges. Anat. **71:** 382, 1924. Cannon, W. B.; Lewis, J. T., and Britton, S. W.: A Lasting Preparation of the Denervated Heart for Detecting Internal Secretion with Evidence for Accessory Accelerator Fibers from the Thoracic Sympathetic Chain, Am. J. Physiol. **77:** 326-352 (July) 1926.

11. Jonesco, D.; Enachescu, M., and Teitel, A. B.: Untersuchungen bei Säugetieren und beim Menschen über die aus dem Brustgrenzstrang unterhalb des Ganglion stellatum entsprungenen Herznerven, Klin. Wchnschr. **7:** 991-992 (May 20) 1928. Kuntz, Albert, and Morehouse, Albert: Thoracic Sympathetic Cardiac Nerves in Man: Their Relation to Cervical Sympathetic Ganglionectomy, Arch. Surg. **20:** 607-613 (April) 1930.

12. Woollard, H. H.: The Innervation of the Heart, J. Anat. **60:** 345-373 (July) 1926.

13. Levy-Simpson, S.; Brown, G. E., and Adson, A. W.: Observation on the Etiologic Mechanism in Raynaud's Disease, Proc. Staff Meet., Mayo Clin. **5:** 295-298 (Oct. 15) 1930. Telford, E. D.: Sympathectomy: A Review of One Hundred Operations, Lancet **1:** 444-446 (March 3) 1934.

pathetic trunk below the second thoracic ganglion, we have sought such a pathway within the vertebral canal.

The gray communicating rami send small recurrent branches into the intervertebral foramina, which, according to the current textbook accounts, terminate in the walls of the blood vessels in the vertebral canal and the membranes enveloping the spinal nerve roots. The segmental arteries and veins that traverse the intervertebral foramina anastomose freely within the vertebral canal and form somewhat irregular longitudinal channels. If sympathetic fibers ascend in the vertebral canal, it might be assumed that they follow these vascular channels. Such fibers have been demonstrated along these vascular channels in human cadavers, but the ultimate connections of the ascending fibers with the brachial plexus could not be demonstrated in human material by the available methods of study. In experimental animals (cats) I have been able to demonstrate the existence of sympathetic fibers which arise below the level of the second thoracic segment, ascend in the vertebral canal and join the seventh and eighth cervical and first thoracic nerves by way of the corresponding intervertebral foramina, following extirpation of the inferior cervical and first and second thoracic segments of the sympathetic trunk. Such fibers could not be demonstrated in all the animals studied, and there is no reason to assume that they reach the distal parts of the upper extremity in all the cases in which they are present. These results in experimental animals, however, suggest a plausible explanation of the existence of some functional sympathetic fibers in the upper extremity in certain clinical cases following extirpation of the inferior cervical and first and second thoracic segments of the sympathetic trunk.

In view of the reported results of sympathectomy carried out for the relief of pain, particularly in the lower part of the abdomen and pelvis and in the face, exact knowledge of the anatomic relationships of the afferent spinal nerve components associated with the sympathetic nerves in question is important. All the nerves extending from the sympathetic trunks to the thoracic, abdominal and pelvic viscera, except the superior cervical sympathetic cardiac nerves, comprise visceral afferent as well as visceral efferent or sympathetic fibers. These afferent fibers also traverse the terminal plexuses. The major portion of the afferent supply to the pelvic viscera, moreover, traverses the hypogastric plexuses, and the fibers in question enter the spinal cord in the upper lumbar or higher segments. Extirpation of any portion of the sympathetic trunk from the lower cervical segments downward, section of any of the thoracic or abdominal rami arising from the sympathetic trunk, or section of the hypogastric plexuses, consequently, interrupts afferent as well as efferent conduction pathways. Afferent spinal nerve components probably do not traverse the upper cervical portion of the sympathetic trunk and the superior cervical ganglion. Afferent components of the upper thoracic nerves which traverse the inferior cervical ganglion, however, join the plexus on the common carotid artery and ascend into the cephalic area by way of the plexuses on the internal and external carotid arteries (fig. 5).[14] Extirpation of the inferior cervical ganglion, consequently, interrupts afferent spinal nerve components the terminal distribution of which is in the cephalic area.

1402 South Grand Boulevard.

14. Kuntz, Albert: Nerve Fibers of Spinal and Vagus Origin Associated with the Cephalic Sympathetic Nerves, Ann. Otol., Rhin. & Laryng. **43**: 50-67 (March) 1934.

THE RÔLE OF THE AUTONOMIC NERVOUS SYSTEM IN THE PRODUCTION OF PAIN

LOYAL DAVIS, M.D.
AND
LEWIS J. POLLOCK, M.D.
CHICAGO

A form of pain originating from deeper structures in the extremities has been thought by Foerster [1] to be conveyed through the periarterial plexuses into the sympathetic chain. He believes that in the upper extremities some of the afferent fibers are sympathetic and in part reach the sympathetic chain through the rami communicantes of the spinal nerves from the arms and partly through the vascular plexus of the subclavian artery and its branches. In either case they reach the sympathetic ganglions and from there travel through the first to the fifth thoracic posterior roots into the spinal cord. In the lower extremity he believes that afferent impulses pass through the rami communicantes of the lumbosacral nerves or by the periarterial network of the tibial, popliteal, femoral and iliac arteries and the aorta, to end directly in the sympathetic ganglionic chain. From there they enter the spinal cord by way of the thoracic posterior roots.

Failure of section of the posterior root of the fifth nerve to relieve certain so-called atypical facial neuralgias likewise has called attention to the possible rôle played by the autonomic nervous system in the production of pain. Attempts to relieve such pain by excision and section of various parts of the autonomic supply to the head has led to the assumption that painful impulses travel along the autonomic nervous system in these cases.

It is in relation to visceral pain, however, that the autonomic system has been held to have the closest relation. This pain has been thought to be of two types: true splanchnic or visceral pain,[2] and referred pain.[3] Although recent workers in general believe in the existence of these two types of visceral pain, there is some difference of opinion as to whether the pain is referred from the viscera or, as stated by Morley,[4] from the peritoneum.

The rôle of the autonomic nervous system in the production of pain has been studied in relation to afferent fibers either traveling along with it or constituting a part of it. We propose to show that, so far as is proved, it is only the efferent fibers of the autonomic system itself which are concerned with the production of pain and that such afferent fibers as travel along with it belong to the ordinary spinal sensory system.

In relation to pain from the extremities, we [5] have previously shown that complete deafferentation of an extremity in man destroyed all forms of sensibility and that complete denervation of the peripheral nerves of

From the Departments of Surgery and Nervous and Mental Diseases, Northwestern University Medical School.

Read before the Section on Pathology and Physiology at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

1. Foerster, Otto; Altenburger, H., and Kroll, F. W.: Ueber die Beziehungen des vegetativen Nervensystem zur Sensibilität, Ztschr. f. d. ges. Neurol. u. Psychiat. **121**: 140, 1929.

2. Ross, J.: On the Segmental Distribution of Sensory Disorders, Brain **10**: 333, 1888. Head, Henry: On Disturbances of Sensation with Especial Reference to the Pain of Visceral Disease, Brain **16**: 1, 1893; **17**: 339, 1894; **19**: 153, 1896.

3. Lange, C.: Nogle bemärkninger am neuralgier og deres behandlung, Hospitalstid. **2**: 641, 1875. Ross.[2] Head.[2] Mackenzie, James: Symptoms and Their Interpretation, London, Shaw & Sons, 1920.

4. Morley, John: Abdominal Pain, New York, William Wood & Co., 1931.

5. Davis, Loyal, and Pollock, L. J.: The Peripheral Pathway for Painful Sensations, Arch. Neurol. & Psychiat. **24**: 883 (Nov.) 1930.

an extremity in a decerebrate cat completely abolished all reflexes ordinarily observed as resulting from painful stimuli. We have also shown that in other animals complete severance of all peripheral nerves abolishes all evidence of pain from stimulation of skin, subcutaneous tissue, vessels, bone and periosteum. Our conclusion that there was no evidence for the existence of a sensory pathway through the autonomic system has received recent confirmation by the work of Moore and Singleton.[6] These authors were unable to produce pain by intra-arterial injections of an irritant after the extremities of animals were completely deprived of their peripheral nerve supply or after section of the appropriate posterior roots. They were unable to stop pain by removal of the autonomic supply to the extremity. The fibers carrying the painful impulse, they believe, pass centrally in the peripheral branches of the spinal nerves and enter the spinal cord by way of the posterior roots. It would seem, as Kuntz[7] has said that "the data available at present . . . do not prove the existence of any autonomic neurons which are incorporated in conduction pathways through which afferent impulses are conveyed into the central nervous system."

As is well known, a type of referred visceral pain can be stopped by anesthetizing the area of skin into which the pain is referred. When in some former experiments we were unable to stop pain produced by distention of the gallbladder by severing the intercostal nerves, we felt that this pointed to the existence of both true visceral, or splanchnic, pain and a referred pain. In these experiments we were able to confirm the previous work of Davis[8] and of Ivy and Schrager,[9] which showed that these painful impulses from the gallbladder traveled along with the right splanchnic nerve into the spinal cord by way of the posterior roots. Later, Stone was unable to stop such pain by section of the appropriate anterior roots. So far as the gallbladder is concerned, all forms of pain, referred or splanchnic, are stopped by severing the right splanchnic nerve. Moore and Singleton have shown that pain arising from the injection of irritants into the hepatic, splenic and superior mesenteric arteries is carried by way of either the major splanchnic nerves, or the sympathetic chain, and enter the spinal cord. Although it may be demonstrated that afferent painful impulses from the viscera are carried along with the autonomic nervous system, we have no proof that the impulses are actually carried over autonomic neurons.

In considering painful impulses from the head and diaphragm, an entirely different situation is met. When one stimulates the superior cervical ganglion, pain is felt in the distribution of the trigeminal nerve.[10] The autonomic supply to the structures of the face and head are considered as consisting of purely efferent fibers.[11] We[12] have shown that section neither of the first eleven anterior roots nor of the first twelve to fifteen posterior roots prevented pain from stimulation of the superior cervical ganglion. When the cervical posterior roots were severed to interrupt any pain arising from impulses carried by nervi nervorum or nerves to structures surrounding the ganglion and, simultaneously, the posterior root of the trigeminal nerve was sectioned, all pain ceased. At that time we pointed out that in the production of pain the autonomic system acted through an efferent impulse which produced some effect on the skin and other structures the exact nature of which we were unable to state, and that from these structures, because of stimulation by a possible hormone or change in vascular supply, an impulse traveled over the ordinary sensory pathway of the trigeminal nerve.

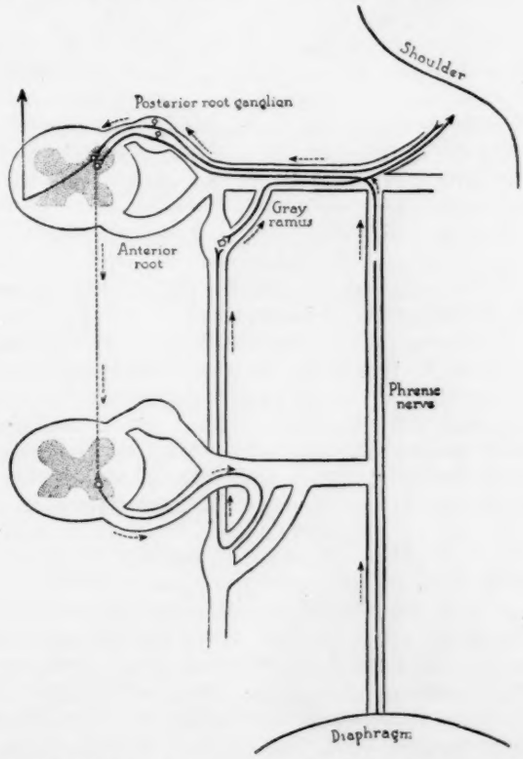


Diagram illustrating pathway of painful impulses produced by stimulation of the diaphragm.

Recently we[13] have reported our results on a study of the pain produced by stimulation of the diaphragm with a faradic current. As has been pointed out by Capps and Coleman,[14] when the central part of the peritoneal surface of the diaphragm is stimulated, a pain is produced which is felt along the trapezius ridge. Such pain, called shoulder tip pain and due to disease of the viscera, has been stopped by the production of cutaneous analgesia of this area by many observers.[15] Woollard, Roberts and Carmichael[16] were unable to do this, but we recently had the opportunity to observe a number of patients in whom a phrenic exeresis was being performed. After exposure of the phrenic nerve in the neck, it was stimulated by

6. Moore, R. M., and Singleton, A. O., Jr.: Studies on Pain Sensibility of Arteries; Peripheral Paths of Afferent Neurons from Arteries of Extremities and of Abdominal Viscera, Am. J. Physiol. **104:** 267 (May) 1933.

7. Kuntz, Albert: Textbook on Neuro-Anatomy, Philadelphia, Lea & Febiger, 1931.

8. Davis, Loyal; Hart, J. T., and Crain, R. C.: Pathway for Visceral Afferent Impulses Within Spinal Cord; Experimental Dilatation of Biliary Ducts, Surg., Gynec. & Obst. **48:** 647 (May) 1929.

9. Schrager, V. L., and Ivy, A. C.: Symptoms Produced by Distention of Gallbladder and Biliary Ducts, Surg., Gynec. & Obst. **47:** 1 (July) 1928.

10. Frazier, C. H., and Russell, E. C.: Neuralgia of the Face: An Analysis of 754 Cases with Relation to Pain and Other Sensory Phenomena Before and After Operation, Arch. Neurol. & Psychiat. **11:** 557 (May) 1924. Peet, M. M.: Postherpetic Trigeminal Neuralgia: Persistence of Pain After Section of the Sensory Root of the Gasserian Ganglion, J. A. M. A. **92:** 1503 (May 4) 1929.

11. Langley, J. N.: Observations on the Medullated Fibers of the Sympathetic System and Chiefly on Those of the Gray Rami Communicantes, J. Physiol. **20:** 55, 1896. Ranson, S. W., and Billingsley, P. R.: Branches of the Ganglion Cervicale Superius, J. Comp. Neurol. **29:** 367, 1918.

12. Davis, Loyal, and Pollock, L. J.: The Rôle of the Sympathetic Nervous System in the Production of Pain in the Head, Arch. Neurol. & Psychiat. **27:** 282 (Feb.) 1932.

13. Pollock, L. J., and Davis, Loyal: Visceral and Referred Pain, to be published.

14. Capps, J. A., and Coleman, G. H.: Pain in the Pleura, Pericardium and Peritoneum, New York, Macmillan Company, 1932.

15. Weiss, Soma, and Davis, David: The Significance of the Afferent Impulses from the Skin in the Mechanism of Visceral Pain, Am. J. M. Sc. **176:** 517 (Oct.) 1928. Morley.[4]

16. Woollard, H. H.; Roberts, J. E. H. and Carmichael, E. A.: An Inquiry into Referred Pain, Lancet **1:** 337 (Feb. 13) 1932.

a faradic current. When pain was produced, it was always referred to the trapezius ridge or supraclavicular region. When this cutaneous area was rendered analgesic, stimulation of the nerve no longer produced pain. In our report we described the effect of severing and removing various parts of the nervous system on the results of stimulating the central part of the peritoneal diaphragm. We found that to prevent the effect of an overflow of current to the periphery of the diaphragm it was necessary either to sever the spinal cord below the level of the third thoracic segment or to sever the thoracic posterior roots. This did not prevent pain from stimulation of the diaphragm. After one or the other of these operations had been performed and both phrenic nerves were severed, the pain could no longer be produced. It was also prevented by severing the cervical posterior roots, though the phrenic nerves were left intact. When the spinal cord was transected at the level of the seventh cervical segment the pain was stopped, and when the second thoracic segment of the cord was destroyed it could not be produced. Pain was also stopped by severing the eighth cervical and first, second, third and fourth anterior roots or by removing both cervical sympathetic chains.

It may be seen from these experiments that painful impulses from the diaphragm travel over the phrenic nerves into the spinal cord by the cervical posterior roots and descend, probably by short pathways, to the level of the second thoracic segment. At that level a synapse with the cells in the anterolateral column occurs and the impulses pass out through the cervical eighth and thoracic first, second, third and fourth anterior roots to the cervical sympathetic chain. Over efferent fibers the impulses are carried to the skin and other structures, as shown in the accompanying illustration. Some physiologic process then occurs, the nature of which is unknown. From the periphery, the impulses then travel over the ordinary spinal sensory nerves into the spinal cord by the posterior roots. When the area of skin into which the pain is referred is rendered analgesic, although all other structures are intact, no pain is produced by experimental stimulation of the phrenic nerve or by disease of the diaphragm. If one considers the diaphragm as a visceral organ, it is obvious that the pain is not the result of a peritoneal stimulation, since it occurs after section of the cord or after section of the thoracic posterior roots.

Recently we have observed some animals decerebrated by the anemic method. When the gallbladder of these animals was distended, marked swishing of the tail, running movements, and torsion of the trunk resulted. When the splanchnic nerves were severed, no reflex activity was observed; but when all the intercostal nerves were severed and the splanchnic nerves left intact, the same reflexes were seen. We believe there is no proof that viscerosensory and visceromotor reflexes should be considered as nothing more than peritoneosensory and peritoneomotor reflexes, although there is no reason to believe that both types of reflexes should not exist.

As in the case of pain in the face, so in the pain referred from stimulation of the diaphragm it is seen that the only proved contribution of the autonomic system to the production of pain is in its efferent arc.

The former theories of the mechanism of referred pain were fairly similar. Ross held that, after reaching the gray matter of the posterior horns from the splanchnic nerves, a diffusion of the stimulus to the roots of the corresponding somatic nerves caused an associated pain in the territory of distribution of these nerves. Lange described it as a radiation along sensory nerves. Mackenzie believed that an irritable focus was set up by radiation which lowered the threshold and thus produced cutaneous hyperalgesia. Head thought that because the internal organs are devoid of epicritic sensibility they react much as does the skin when epicritic sensibility is absent and protopathic sensibility is present. When a painful stimulus is applied to a part of low sensibility in close central connection with a part of higher sensibility, the pain produced is felt in the part of higher sensibility rather than in the part of lower sensibility to which the stimulus was actively applied. Lemaire[17] placed the radiation in the posterior root ganglion instead of within the spinal cord.

With the discovery by Weiss and Davis and by Lemaire and others that cutaneous analgesia stops pain due to visceral disease referred to that area of skin, other theories have been developed. Verger[18] traced the impulses by way of sympathetic afferents through the posterior roots to the anterolateral column, then by sympathetic efferent fibers running antidromically in the posterior roots to the skin. A sensory impulse from the skin is then conducted by way of the sensory cerebrospinal system. A somewhat sounder theory is proposed by Spameni and Lunedei,[19] who state that the visceral impulses that reach the lateral columns of the cord by afferent pathways stimulate centrifugal unmyelinated fibers, which terminate in the sensory corpuscles. Physicochemical changes are thus produced which stimulate the sensory organs from which impulses travel over the cerebrospinal nerves. Unaware of Spameni's and Lunedei's theory, we reconstructed such a pathway as a result of our experiments on stimulation of the superior cervical ganglion. Our recent experiments on the diaphragm, in our opinion, add confirmative evidence of such a pathway. This pathway has a sound anatomic basis and does not call into play any hypothetic radiation, irritable foci, lowering of threshold or diffusion.

There is no anatomic proof of the existence of an autonomic sensory neuron. There is, however, anatomic and physiologic evidence of a pure autonomic motor neuron, as exemplified in the cervical sympathetic chain. The only connection of the autonomic system with the spinal cord is by means of a preganglionic fiber. Such afferent fibers as are found in the autonomic system seem to be connected with the spinal cord, in a manner similar to the connections of a peripheral nerve.

The only proved contribution of the autonomic nervous system to pain is in relation to referred pain, in the production of which the efferent, not the afferent, fibers are utilized. In relation both to pain in the face and shoulder tip pain referred from the diaphragm there is physiologic proof to support this theory. In relation to the former, we are dealing only with autonomic efferent fibers in the cervical sympathetic chain. In the latter, severance of the appropriate purely motor anterior roots, which contribute to the cervical sympathetic chain, prevented diaphragmatic pain.

The impulses of referred pain travel from the viscera along with either autonomic or spinal sensory fibers to the spinal cord by way of the posterior roots. After passing over a synapse with cells in the anterolateral

17. Lemaire, A.: La perception des douleurs viscérales, Rev. méd. de Louvain, 1926, No. 6, p. 81.

18. Verger, H.: Sur une modification du scheme de Lemaire pour la conception physiologique de réflexe viscéro-sensitif de Mackenzie, Gaz. d. sc. med. **43**: 419, 1927.

19. Spameni, P., and Lunedei, A.: Sui riflessi viscero-cutanei e sul mecanismo di produzione del dolore nelle affezioni dei visceri e delle sierose, Riv. di clin. med. **28**: 758 (Oct. 15) 1927.

column, the impulses travel over preganglionic efferent fibers to the autonomic ganglions. A postganglionic fiber then carries the impulses to the skin, where the sensory end organs are stimulated. Thus, an ordinary somatic painful impulse is produced which travels over the spinal sensory nerves, enters the spinal cord by way of the posterior roots, and ascends in the lateral spinothalamic tract to a cortical level.

54 East Erie Street — 25 East Washington Street.

CLINICAL TESTS OF FUNCTION OF THE AUTONOMIC NERVOUS SYSTEM

GEORGE E. BROWN, M.D.
ROCHESTER, MINN.

Physiologists have demonstrated that a large percentage of smooth muscle and glandular tissues, as well as some of the other tissues of the body, have a dual nerve supply. There are fibers from both the parasympathetic (vagus) and the sympathetic system. It is generally accepted that the impulses which reach these tissues through one set of nerves produce an antagonistic reaction as compared to the effects produced by the impulses of the opposite set of nerves. This opposition of two types of reactions produced by two sets of nerves has therefore led to the attempt to apply this information to clinical problems. There have been much clinical theorizing and some serious attempts to establish a physiologic basis for the explanation of functional disorders. The conception of vagotonia and sympathicotonia [1] was based on the premise that in health there was an equilibrium or balance of the sympathetic and parasympathetic division of the vegetative and autonomic nervous system.

Functional disorders were expressed by disturbance in the balanced control. With preponderance of tonus in the vagus system, symptoms referable to increased sensitivity of this anatomic division existed and were designated as a state of vagotonia. Increased tonus in the sympathetic division was known as sympathicotonia. The imbalance of two nervous components was tested with pharmacologic agents to determine the sensitivity of the two systems. Epinephrine and ergotamine were employed to determine the sensitivity of the sympathetic system. Atropine, muscarine, pilocarpine and physostigmine determined reactivity of the parasympathetic system. The vagus-stimulating hormone acetylcholine had not yet been identified.

Time has demonstrated that symptoms of functional disorders cannot be clearly differentiated on the basis of vagus sympathetic imbalance. Usually, both divisions are involved. Testing of clinical subjects with drugs is not satisfactory and conclusions based on this procedure are faulty. Another important factor in the inadequacy of the clinical conception of Eppinger and Hess [1] was the failure to utilize quantitative methods for measuring the response.

These deficiencies explain the weakness of this conception in the elucidation of clinical problems. To these workers, however, much credit is due for emphasizing the importance of dysfunctions of the autonomic nervous system in functional disorders. Peterson and others [2] have suggested the terms parasympathetic status and sympathetic status. The former they believe is associated with dilatation of capillaries, activity of tissues, and "dissimulation of calcium and hydration." Sympathetic status is concerned with rest of tissues, vasoconstriction, accumulation of calcium, and dehydration. Kuntz [3] has discussed the conception of functional antagonism of sympathetic and parasympathetic nerves and concluded that, in the light of our knowledge of blood vessel innervation, some other basis must be advanced. Mutual synergism, rather than antagonism, of these components is present in their functional activity.

NEWER APPROACHES

Methods have been evolved which attempt to measure reactability of physiologic units of the autonomic nervous system. These methods have been based on two premises: first, the response of the sympathetic mechanism to stress and, second, the measurement of responses with quantitative methods. Measurements of the temperature of the skin and determination of the heat eliminated by the extremities determine indirectly variations in vasomotor function. The presence or absence of sweating is determined by a colorimetric method.[4] The response of blood pressure to a standard form of stimulation and to passive and active changes in posture, and the responses of the cardiac rate to standard exertion tests have been utilized. The fundamental basis of this type of clinical investigation is based on measuring the response of the sympathetic mechanism to stress. The adequacy or range of these responses is determined for normal subjects. Variation from the normal response, as measured in quantitative units, establishes the pathologic range.

METHODS

Measurement of Vasoconstriction.—Several methods are useful for measuring grades of vasoconstriction and available vasodilatation in extremities. The first test employed to measure the range of vasodilatation utilized the dilating effect of fever. One of the most important functions of the vasomotor mechanism is the restriction or acceleration of elimination of heat from the surface of the body. During the period of systemic fever and under resting or basal conditions in a room with a temperature which is maintained between 24 and 26 C., the temperatures of the digits of the hands and feet of the subject are taken every thirty minutes. Three values are obtained: (1) the range of vasodilatation, that is, the increase in the surface temperature from the basal to the maximal level; (2) the maximal level of dilatation, that is, the highest surface temperature attained in the digits, and (3) the vasomotor index, which is the increase in surface temperature divided by the oral temperature. This gives the amount of surface dilatation obtained for each degree of fever.[5] Immersion of the hands or feet in hot water (45 C.) for from thirty minutes to an hour affects vasodilatation of the unimmersed extremities by probable stimulation of the vasodilator nerves.[6] The coefficient of vasodilatation is

---

Dr. Brown died, Nov. 28, 1935.

From the Division of Medicine, the Mayo Clinic.

Read before the Section on Pathology and Physiology at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

1. Eppinger, Hans, and Hess, Leo: Zur Pathologie des vegetativen Nervensystems, Ztschr. f. klin. Med. **67**: 345-351, 1909; **68**: 205-230, 1910.

2. Peterson, W. F.; Levinson, S. A., and Hughes, T. P.: Studies in Endothelial Permeability: The Effect of Epinephrine on Endothelial Permeability, J. Immunol. **8**: 323-348 (Sept.) 1923.

3. Kuntz, Albert: Autonomic Nervous System, ed. 2, Philadelphia, Lea & Febiger, 1934.

4. Roth, Grace M., and Brown, G. E.: Unpublished data.

5. Brown, G. E.: The Treatment of Peripheral Vascular Disturbances of the Extremities, J. A. M. A. **87**: 379-383 (Aug. 7) 1926.

6. Landis, E. M., and Gibbin, J. H. Jr.: A Simple Method of Producing Vasodilatation in the Lower Extremities, with Reference to Its Usefulness in Studies of Peripheral Vascular Disease, Arch. Int. Med. **52**: 785-808 (Nov.) 1933.

less than that obtained with fever or anesthesia. Other methods for measuring vasodilatation are based on procedures that temporarily interrupt vasomotor action. Spinal anesthesia produces complete dilatation of the vessels of the lower extremities by temporary blocking of the vasomotor nerves. General anesthesia produces complete generalized vasodilatation.[7] Anesthesia of the mixed nerve trunks affects regional vasodilatation.[8]

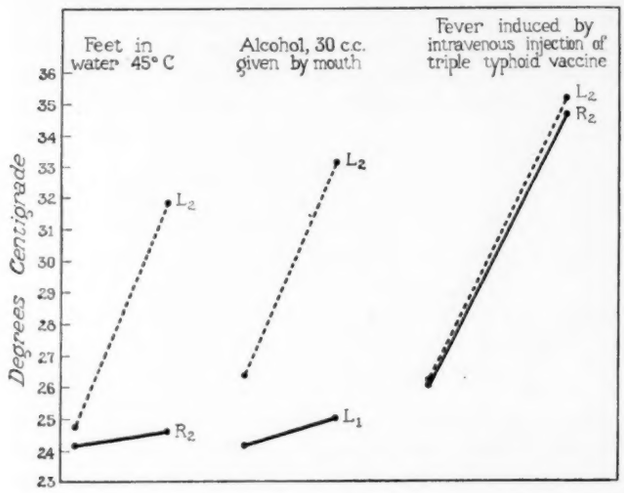


Fig. 1.—Effect of vasodilating agents on the temperature of the extremity in a case of Raynaud's disease. Intensity of the spasm was high, and vasodilatation was incomplete with heat and alcohol but complete with fever.

Various vasodilating drugs have been studied in order to determine their vasodilating efficiency. Alcohol,[9] mecholin [10] and theobromine,[11] taken by mouth, induce variable degrees of peripheral vasodilatation. Their relative vasodilating efficiency is in the order named. Papaverine administered intravenously has a definite peripheral vasodilating action. Because of individual susceptibility, the effect of these drugs is not uniform. Intensity of vasoconstriction is variable in the presence of different diseases, and complete vasodilatation may not be induced with drugs or with high environmental temperatures (fig. 1).

Methods for Studying Function of Sweating.—Quantitative measurement of degrees of sweating has not been entirely satisfactory. Physical methods can be used for measuring the electrical potential of the skin, which determines the degree of moisture present. The method has not yet been developed to a point at which it is entirely satisfactory for clinical use. A method that is less accurate than the former method depends on the application of alcoholic solution of cobalt blue to the skin. The patient is placed in a heat cabinet, which has an environmental temperature of 130 F. (54.4 C.), until sweating is induced. In the presence of moisture, the blue stain is changed to varying degrees of red [4] (fig. 2). Imperceptible degrees of sweating can be detected with this procedure.

Testing the Vasomotor Mechanism by Measuring the Reactability of the Systemic Blood Pressure.[12]—The cold pressor test is carried out as follows: The patient rests for from twenty to thirty minutes, or until the basal blood pressure is obtained. One hand is immersed above the wrist in ice water (4 C.) for one minute. Readings of the blood pressure in the opposite arm are taken every fifteen seconds. A sharp increase in both the systolic and the diastolic blood pressure occurs. The hand is removed from the water. The blood pressure returns to its basal level within two minutes in cases in which the level of blood pressure is normal. If the subject has hypertension, the return to the basal level is delayed for a duration longer than two minutes (fig. 3).

The cold pressor test measures the reactability of the vasomotor mechanism of the individual. This response is quite uniform for the individual. Repetition of this test carried out from day to day shows an average difference of less than 10 per cent. For "normal" subjects the mean increase is approximately 12 mm. of mercury for the systolic and 10 mm. of mercury for the diastolic pressure. The upper range of normal response has been placed tentatively at 22 mm. of mercury for the systolic and 18 mm. of mercury for diastolic pressure. Responses in the upper normal range may be found in hyperthyroidism, neurocirculatory asthenia and Raynaud's disease. Hypertensive subjects and those who have a family history of hypertension show an increase from three to ten times that shown by normal subjects. In no other disease has a maintained hyperreaction been found. Other tests for measuring reactability of the blood pressure are the inhalation of 10 per cent concentration of carbon dioxide in oxygen. The pressor test measures the response, or rise in blood pressure, and the maximal point, a value that has been designated as the "ceiling."

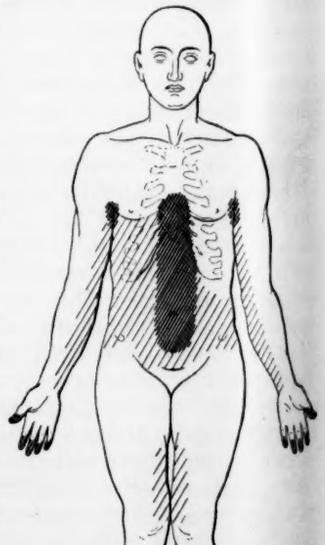


Fig. 2.—Patient with postural hypotension. Sweating test revealed a partial anhidrosis. Shaded areas indicate sweating.

Tests for Measuring the Effect of Posture on the Blood Pressure.—One procedure is carried out by placing the subject on a table that can be tilted at different angles without exertion on the part of the patient. The blood pressure and pulse rates are taken while the patient is in the horizontal, upright and intermediate positions. This is called the "passive postural test." The "active postural test" is carried out by taking the blood pressure and pulse while the patient is in the reclining and standing positions.

7. Scott, W. J. M., and Morton, J. J.: Obliteration of Vasoconstrictor Gradient in the Extremities Under Nitrous Oxide-Oxygen, Ether, and Tribromethyl Alcohol Anesthesias, Proc. Soc. Exper. Biol. & Med. **27:** 945-949 (June) 1930.

8. White, J. C.: Diagnostic Blocking of Sympathetic Nerves to Extremities with Procaine: A Test to Evaluate the Benefit of Sympathetic Ganglionectomy, J. A. M. A. **94:** 1382-1388 (May 3) 1930.

9. Cook, E. N., and Brown, G. E.: The Vasodilating Effects of Ethyl Alcohol on the Peripheral Arteries, Proc. Staff Meet., Mayo Clin. **7:** 449-452 (Aug. 3) 1932.

10. Starr, Isaac, Jr.: Acetyl-B-Methylcholin: Its Action on Paroxysmal Tachycardia and Peripheral Vascular Disease, with a Discussion of Its Action in Other Conditions, Am. J. M. Sc. **186:** 330-345 (Sept.) 1933.

11. Scupham, G. W.: Some Clinical Observations on the Use of Theobromine in Peripheral Vascular Disease, J. Clin Investigation **10:** 165 (April) 1931.

12. Hines, E. A., Jr., and Brown, G. E.: A Standard Test for Measuring the Variability of Blood Pressure; Its Significance as an Index of the Prehypertensive State, Ann. Int. Med. **7:** 209-217 (Aug.) 1933.

The Standard Exercise Tolerance Test.[13]—The method described by Master and Oppenheimer is used. This employs a staircase that has a height of 1½ feet and consists of two steps. The standard exercise is fifteen trips for each minute. The response of the pulse and blood pressure is then measured and the amount of time necessary for these to return to their previous levels is noted. An approximation of the number of foot pounds of work performed may be determined roughly by multiplying the weight of the patient by the height of the staircase (1½ feet) and then multiplying the result by the number of trips performed. Other forms of exercise tests for clinical use have not been as satisfactory; the so-called hop test varies greatly with the ability of the individual to perform the exercise, and it is impossible to determine the foot pounds of work performed.

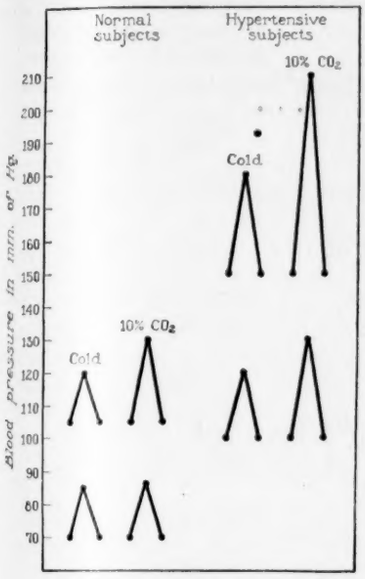


Fig. 3.—Response of the blood pressure of normal and hypertensive subjects to cold and carbon dioxide pressor tests.

CLINICAL APPLICATION

Tests for Vasodilatation.—The usefulness of determining the amount of vasodilatation in digits is twofold: First, it aids in the differentiation of the organic and vasomotor disturbances of the extremities. In pure vasomotor disorders such as Raynaud's disease and other forms of vasospastic disturbances, vasodilatation as measured by the increase in the surface temperature is uniform in the different digits. If organic disease coexists with vasospasm, there are variations in the amount of dilatation obtained in the digits (fig. 4). This method assists in localizing the presence and degree of localized arterial insufficiency. Arteriography of the vessels of the hands has proved an accurate procedure, because visual evidence is obtained of closure in arteries that are not palpable. Arteriography cannot be applied with the same accuracy in the feet as it can in the hands. Second, the vasodilating test assists in the selection of patients who have occlusive arterial disease for sympathetic ganglionectomy. The need for accurate preoperative selection of patients led to the development of this procedure.[14] In cases of thrombo-angiitis obliterans, scleroderma and advanced forms of Raynaud's disease it is necessary before operation to have adequate information as to the amount of potential vasodilatation existent in the affected extremity.

If minimal degrees of vasodilatation are present, operation that involves the sympathetic nerves is not indicated. It may generally be said that an increase of from 4 to 5 degrees C. in the surface temperature, or maximal vasodilatation indicated by a surface temperature of 30 C., or a vasomotor index of 2 or more is essential to justify operation. As changes in the vasodilating component may occur within one month, repetition of tests may be advisable.

Sweating Tests.—Tests for sweating have two important applications: First, they assist in the diagnosis of diseases affecting the function of sweating, such as the syndrome known as postural hypotension, a disease affecting the vasomotor nerves and also involving the fibers that control sweating. The response of sweating to a high environmental temperature determines the presence or absence of generalized or localized forms of anhidrosis, hypohidrosis or hyperhidrosis. Second, the test is of great importance in demonstrating whether or not complete denervation of the sympathetic fibers to the hands or feet is present after cervicothoracic or lumbar sympathetic ganglionectomy.

It may be said that in several hundred cases no instance of sweating of the feet has been demonstrated after removal of the second, third or fourth lumbar sympathetic ganglions. The operative problem for removal of the upper cervicothoracic ganglions is more difficult. Rami may be missed; this is determined postoperatively by the demonstration of sweating areas in the hands. Repetition of the sweating test at intervals of months determines whether regeneration of nerve fibers has occurred.

Tests of Vasomotor Reactability.—These tests probably are of great importance. The "cold pressor test" seems to fulfil the requirements of a standard test of this type. Its simplicity, the uniformity of the stimulus and the invariable pressor response of the blood pressure are proof of its effectiveness. The rise in the blood pressure, or the response, and the maximal point, or "ceiling," determine a pattern of the individual vasomotor reactions. Our studies at the clinic have led us to believe that hyperreactions are synonymous with potential or existent essential hypertension. This I believe is true whether the levels of the blood pressure are increased or not.

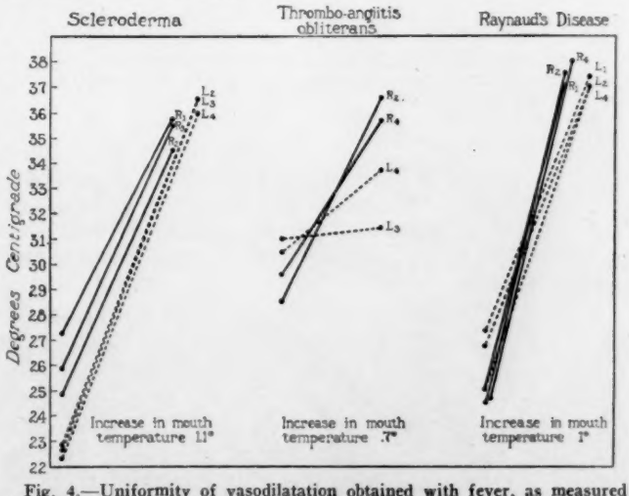


Fig. 4.—Uniformity of vasodilatation obtained with fever, as measured by surface temperature in the digits of a patient with Raynaud's disease compared with variable vasodilatation in digits of a patient with scleroderma and one with thrombo-angiitis obliterans.

Study of large groups of subjects between 4 and 16 years of age indicates that about 15 per cent of them give a hyperreaction. One or both of the parents of these children showed a hyperreaction or had essential hypertension. Conversely, in cases in which children disclosed normal reactions, at least one parent was a normal reactor and had normal levels of blood pressure. This test, then, may be of great use in eugenics in establishing the constitutional nature of essential hyper-

13. Master, A. M., and Oppenheimer, E. T.: A Simple Exercise Tolerance Test for Circulatory Efficiency, with Standard Tables for Normal Individuals, Am. J. M. Sc. **177**: 223-243 (Feb.) 1929.

14. Brown, G. E.; Craig, W. McK., and Adson, A. W.: The Selection of Cases of Thrombo-Angiitis Obliterans and Other Circulatory Diseases of the Extremities for Sympathetic Ganglionectomy, Am. Heart J. **10**: 143-155 (Dec.) 1934.

tension and hypotension. The differentiation of essential hypertension and secondary forms of hypertension that are associated with tachycardia, glomerular nephritis or hyperthyroidism can probably be accomplished by the response of blood pressure to a standard stimulus.

The response and "ceiling" of the blood pressure that occur with the pressor stimulation are accurate measuring rods for evaluating the effects of therapy. Following extensive sympathectomy, one can determine the potential reactability of the remaining portion of the vasomotor nervous system that is left intact. The effects of drugs that increase or decrease vasomotor sensitivity can be evaluated.

Postural Tests.—The effect of posture on the blood pressure is important in the diagnosis of the clinical syndrome known as postural or orthostatic hypotension with syncope. Postural studies should be carried out in all cases of vertigo or weakness appearing when the patient is in the upright position. The postural test is useful in measuring the completeness of resection of splanchnic nerves as carried out in the treatment of essential hypertension. After complete resection of the splanchnic nerves, such as is carried out with anterior

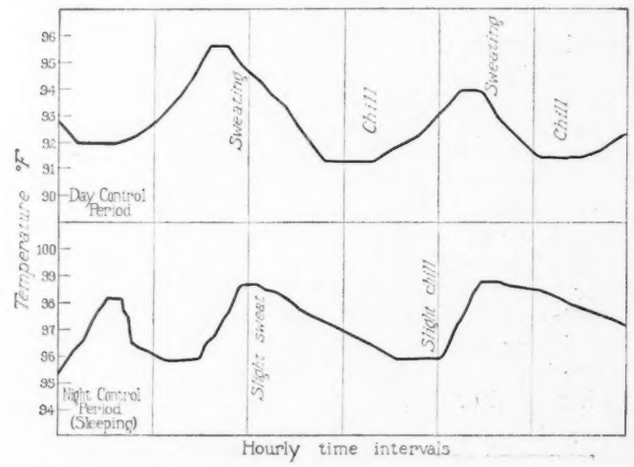


Fig. 5.—Continuous rectal temperature of a patient with paroxysmal hypothermia of many years' duration and probably the result of some central disturbance affecting the heat-regulating mechanism.

rhizotomy, there is a sharp lowering of blood pressure when the patient is in the upright position. An abdominal binder may be necessary, and efficacy of the abdominal support is measured by the manner in which it maintains the blood pressure when the patient is in the upright position.

Functional Tests of the Response of the Heart to Standard Exercise.—The exercise tolerance test is useful in the diagnosis of cardiac neuroses, such as effort syndrome, or neurocirculatory asthenia. If the acceleration response of the heart to the standard exercise is excessive, and if recovery to basal rates is delayed, a control is established for measuring effects of therapy. Vague symptoms may be brought out by this cardiac acceleration test, which frequently give a clue to the basis of the functional derangement. There is a group of young subjects who have an elevation of the systolic blood pressure and other signs of sympathetic overreactivity, such as increased degrees of sweating, flushing and tachycardia. The question arises whether these signs are evidence of early grades of essential hypertension. The normal response in blood pressure to the "cold pressor test" and the abnormal response of the pulse to the exercise tolerance stress distinguish this disorder from essential hypertension.

COMMENTS

Clinical tests to measure responses of the autonomic nervous system have two broad purposes. The first purpose, which probably is more important, is to determine the sensitivity or reactability of this nervous system in different functional disorders. In the conception of vagotonia and sympathicotonia, granting that an equilibrium or balance is maintained between the sympathetic and parasympathetic mechanisms, functional disorders do not follow this hypothetical anatomic balance. Cannon's conception of homeostasis seems to approach more closely the truth, in that the organism as a whole must be kept in a state of equilibrium from the broad physiologic aspect rather than from the narrow anatomic point of view. Health represents an equilibrium or homeostasis of the organism, which is protected with an emergency mechanism adequate to adjust itself successfully to changing environmental stress. Cannon [15] has suggested tests that impose stress on the adapting mechanism of the body. The fitness of the individual to adapt himself to sudden changes in his environment, as carried out by tests similar to those used for aviators in the war, may make "fitness" a quantitative expression.

Many functional disorders, then, represent a departure from this normally balanced physiologic state. This variation may be a diminished response, or hyporeaction, or an excessive response, or hyperreaction. The condition known as essential hypertension is one which, by virtue of some abnormal reactability of the vasomotor mechanism, illustrates an excessive response of the systemic blood pressure to stimulation. This seems to be a constitutional fault demonstrable in early life. It may be the fundamental abnormality which in later years eventuates in the clinical condition known as essential hypertension. In early life this is a functional state, in which the emergency mechanism is too effective in its response to intrinsic and extrinsic stress.

A similar illustration holds in Raynaud's disease and other forms of primary vasospastic neuroses. The response of the surface vessels of normal subjects to cold is constriction of the arterioles and capillaries, which produces faint grades of pallor, rubor or cyanosis of the skin. There is a slowing of the flow of blood in the capillaries. In Raynaud's disease the reaction to cold is exaggerated, but in other respects it is the same as normal. The hyperreaction expresses itself locally, rather than systemically as hypertension. This is an exaggeration of the normal reaction. In both Raynaud's disease and essential hypertension there is a constitutional vasomotor status with excessive responses to certain forms of stress. Erythromelalgia represents an overreaction and excessive vasodilatation of the vessels in the extremities to exercise or heat. The hyporeactive states, such as essential hypotension, are not as clearly defined, and it is doubtful whether they can be classified as pathologic states, as symptoms usually are not present. Lessened wear by virtue of slight reaction, at least as related to blood vessels, promotes longevity rather than shortened cellular life, which is consequent to excessive wear.

The problem of clinical testing consists in subjecting the patient to a standardized form of stimulation in which the response can be compared to that of "normal subjects." In vasospastic disorders, the sharp responses in surface temperature to lowered temperatures, the slower recovery with warm temperatures, and the sharp

15. Cannon, W. B.: Stresses and Strains of Homeostasis, Am. J. M. Sc. **189**: 1-14 (Jan.) 1935.

color changes distinguish abnormal from the normal reactions. In these functional hyperreactive states homeostasis is maintained, but at the expense of excessive reaction in the blood vessels. The extension of this thought in clinical medicine, then, evolves itself around the question of precise forms of tests and their interpretation.

The simple method of testing the cardiac acceleratory response by exertion has long been used in these studies, and a functional disorder of the sympathetic mechanism known as the effort syndrome, or neurocirculatory asthenia, has been recognized. A similar line of reasoning has been carried out in the testing of response of the peripheral vasomotor mechanism. Fever throws on the organism an abnormal stress in attempting to make adjustments that produce vasodilatation of surface vessels. Localized vasospasm may be so intense as not to relax completely with fever, while in normal subjects complete relaxation is invariable. An attempt is being made to determine whether or not variations of this response to various vasodilating measures are of importance in interpreting or differentiating the vasomotor disorders, which are as yet poorly defined. Further development of this theme of testing is being carried out with reference to the disorders of the heat regulating mechanism. There are a group of subjects with abnormally reacting thermoregulating mechanisms (fig. 5). Exaggerated rises in the temperature of the body occur from intrinsic and environmental stress. Accurate devices, which measure and record the temperature of the body continuously, permit of accurate study of this hypersensitive mechanism. Instances have been found in which psychic stimuli were followed by pathologic increases in the temperature of the blood and by subjective symptoms.

The second general purpose of this form of investigation is more specific than the first. The test is used to predict the dilating effects of interruption of the sympathetic nerves by operative measures. One prognostic test based on the response of vasoconstriction to fever determines the available vasodilatation. Another form of investigation does not involve stress per se but reproduces temporarily what is accomplished with operations that involve the sympathetic nervous tracts. Anesthetization of the sympathetic ganglions and peripheral nerves illustrates this point. These procedures determine quantitative effects on the regional circulation by stimulating the vasomotor mechanism or by temporarily paralyzing the sympathetic pathways.

The importance of functional disorders is increasingly evident to the clinician. They represent a puzzling array of symptoms and signs of disturbed function which are slightly understood. These signs and symptoms are difficult to evaluate because of absence of pathologic changes, and because of difficulties in measuring variation from normal reactions. This is especially true in visceral neurosis.

When a disease or disorder can be measured in terms of disturbed function, progress is inevitable. This conception is urgently needed in the large field of functional states. One application of testing emotional-psychic effects on the autonomic nervous system has been in the problem of detection of crime with the so-called lie detector. The broad conception of Cannon has done much to simplify matters, and, as the normal state is visualized, the abnormal state becomes increasingly clear. The newer point of view of Dale [16] is most stimulating. This investigator recommended the separation of the autonomic nervous system into the nerves that are stimulated by epinephrine, which he designated as "adrenergic" nerves, and the nerves that are stimulated by choline, which he designated as "cholinergic" nerves. This pharmacologic classification seems to offer more to the clinician than a separation based on an anatomic division. The entire problem is just in a formative state. Facts are fragmentary, but the problem is assuming a logical and useful pattern. I predict that the next major development in clinical medicine will be in the direction of the autonomic nervous system and its disorders.

16. Dale, H. H.: Chemical Transmission of the Effects of Nerve Impulses, Brit. M. J. 1: 835-841 (May 12) 1934.

ESSENTIAL PHARMACOLOGY OF THE AUTONOMIC NERVOUS SYSTEM

D. E. JACKSON, PH.D., M.D.
CINCINNATI

In one or more of four different places, drugs that affect the autonomic nervous system may exert their actions. These places are, first, the nuclei of origin of the autonomic nerves within the central nervous system; second, the outlying ganglions located on the course of the autonomic pathways; third, the terminations of the autonomic nerves in the structures that are thus innervated, and, last, the carotid sinus. The actual nerve fibers themselves appear to be peculiarly resistant to the action of drugs.

The pharmacology of the autonomic nervous system involves some of the best and most definitely known of all drug phenomena, as well as some of the most obscure. The autonomic nervous system penetrates every nook and corner of the human body; its reaction to drugs is of interest from every angle of the practice of medicine. There is an old saying that providence exercises a special watchfulness over fools. That is exactly what the autonomic nervous system does for all the rest of us. And it does this work so well that probably no one living can quite appreciate all the devious, obscure and intricate means and processes by which our well being, or the reverse thereof, is effected. And there is probably no function, process or reaction of the autonomic nervous system which cannot be, either directly, or indirectly—and usually very specifically—stimulated, depressed or abolished completely by the action of drugs. Thus one might expect a large number of drugs to be included in this list. Of the group known as sympathomimetic amines alone, Tainter has recently been able to investigate some 100 samples. There are now known about 350,000 organic drugs. In addition to these there are a few thousand inorganic substances or combinations. If any one of the great majority of these substances should be brought into solution in the blood it would be extremely likely to affect, in one way or another, some portion of the autonomic nervous system.

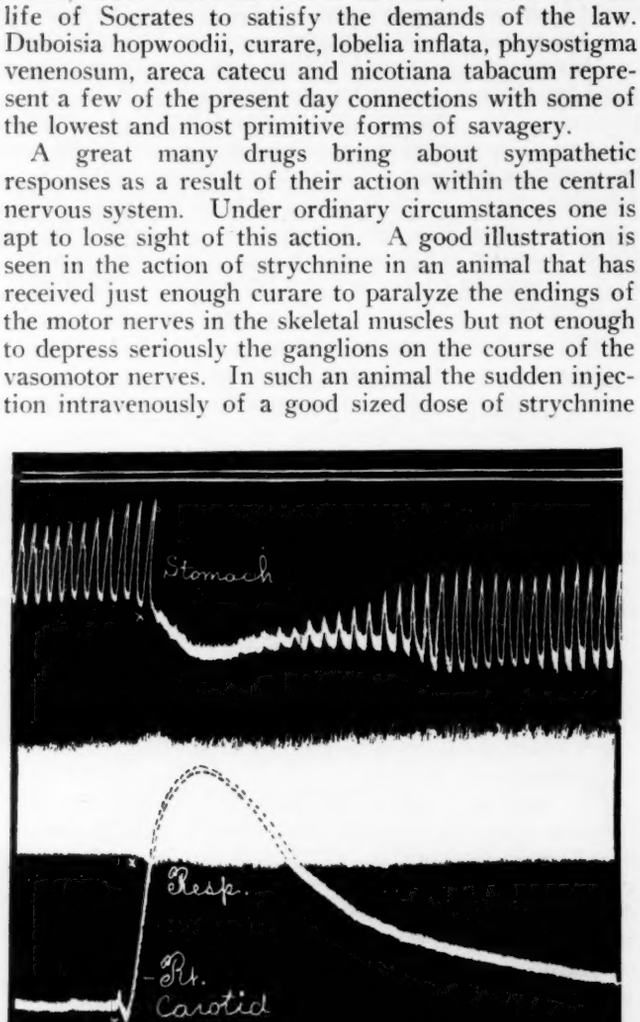
It has been a long time since the crude forms of some of the present day autonomic drugs became known to man. Nearly 5,000 years ago the emperor Shen Nung "tasted" ma huang, from which is derived ephedrine, and decided it was good for fever and for sweating, for both of which it is now known to be of no use whatever. And over 2,000 years ago conium macu-

From the Department of Pharmacology of the University of Cincinnati College of Medicine.

Read before the Section on Pathology and Physiology at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

latum, from which coniine is derived, snuffed out the life of Socrates to satisfy the demands of the law. Duboisia hopwoodii, curare, lobelia inflata, physostigma venenosum, areca catecu and nicotiana tabacum represent a few of the present day connections with some of the lowest and most primitive forms of savagery.

A great many drugs bring about sympathetic responses as a result of their action within the central nervous system. Under ordinary circumstances one is apt to lose sight of this action. A good illustration is seen in the action of strychnine in an animal that has received just enough curare to paralyze the endings of the motor nerves in the skeletal muscles but not enough to depress seriously the ganglions on the course of the vasomotor nerves. In such an animal the sudden injection intravenously of a good sized dose of strychnine



Tracing of stomach, respiration and blood pressure, showing the sympathomimetic action of β-methyl ζ-methylamino-β-γ-heptene in an anesthetized dog.

will produce a marked and prolonged rise in the blood pressure as a result of the strong stimulation of the vasomotor centers in the medulla and cord. Without curare, of course, the rise in blood pressure, although present, would be much involved and obscured by the generalized systemic convulsions.

Many other drugs, in a similar fashion, may thus act centrally to bring about peripheral manifestations of autonomic reactions. The constriction of the pupil and, in dogs, the slowing of the heart by morphine are familiar examples. But many other reactions, such as control of the water distribution in the body, the regulation of body temperature, the control of blood sugar and disturbances of digestion and secretion, may thus be influenced by drugs acting within the central nervous system.

The action of drugs on the peripheral divisions of the autonomic nervous system is an involved and obscure subject.

And it is perhaps, in some respects, rather rapidly becoming more obscure as each specialist in that particular field presents his contribution; for new deals here, as elsewhere, have given a sensation of "shimmying" to foundations on which we formerly felt that we could firmly stand.

Briefly, I may mention some of the older drugs that act on the autonomic ganglions and the peripheral nerve terminations. Among the former are those like nicotine, lobeline, methylhordenine, cytisin and coniine, the action of which consists in a more or less marked primary stimulation of the ganglions, followed, if the dose is large enough, by depression and paralysis. But the action of curare on these ganglions is purely depressant. To this group belong also some other preparations, such as certain trimethyl ammonium compounds and acetylcholine, which has both a nicotine and a muscarine action.

The autonomic nerves are fairly well divided into two great groups, the craniosacral or parasympathetics, and the thoracicolumbar or true sympathetics. Pharmacologically there is a certain amount of overlapping between these two systems. The most obvious example of this is to be found, perhaps, in the sweat glands, the nerve supply of which is derived from the thoracicolumbar group; but these nerves here react to drugs in the same manner as the parasympathetics do in other locations. Parasympathetic nerve terminations are stimulated by such drugs as pilocarpine, muscarine, physostigmine, arecoline, guanidine, methylguanidine and acetylcholine, while the same endings are paralyzed by such drugs as atropine, homatropine, hyoscyamine and scopolamine.

It must be borne in mind that these parasympathetic nerves are further divided into two groups, motor and inhibitory, and when a drug either stimulates or depresses a group of these endings the result will bear its corresponding relation to the physiologic function of that particular group. The same relation holds true with respect to the corresponding reactions and functions of the motor and inhibitory fibers of the true sympathetics.

Following the earlier work of Dale on ergot, it was held for many years that ergotoxine, while stimulating the motor sympathetic endings in small doses, would in larger quantities paralyze these motor endings, leaving the inhibitory endings intact, without having either stimulated or depressed them. A great volume of literature was built up as a result of experiments based on this conception of the action of ergotoxine. But Rothlin [1] has brought forward evidence to show that ergotoxine paralyzes both motor and inhibitory terminations of the true sympathetics. What bearing the latter observations, if finally fully confirmed, may have on the present and earlier conceptions of certain phases of the physiology and pharmacology of the sympathetic nerves remains to be seen.

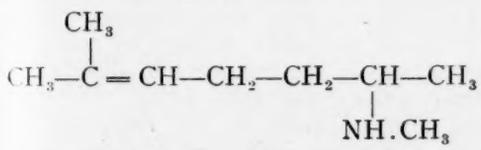
The stimulation of true sympathetic nerve endings by drugs is a very modern conception. Perhaps the earliest and best known example is epinephrine, which has been isolated less than thirty-five years. But in recent years a large number of similarly acting, and often nearly related, compounds have been synthesized or discovered in nature, and certain ones of these have now become widely used in medical practice. In practically all cases these drugs stimulate both the motor

1. Rothlin, E.: Arch. internat. de pharmacodyn. et de thérapie **28**: 459, 1923. J. Pharmacol. & Exper. Therap. **36**: 657 (Aug.) 1929.

and the inhibitory endings of the true sympathetic nerves. Clinically both these reactions are utilized. Epinephrine, for example, will dilate the bronchi by stimulating the endings of the bronchodilator nerves, and it constricts blood vessels when injected with a local anesthetic.

Epinephrine, ephedrine, synephrine, neosynephrine, propadrine (the hydrochloride of phenyl-1-amino-2-propanol-1), beta-tetrahydronaphthylamine, uzarin (a crystalline glucoside derived from an African plant; its chemical structure is unknown but it acts like epinephrine), some samples of methylene blue, tyramine, and the like belong in this group. Usually one expects such compounds to contain a catechol nucleus with a side chain bearing an amino group, but this type of structure is by no means essential. A large number of compounds having an epinephrine-like action in a lesser degree have been synthesized. Most of these are useless in practical medicine, either because they are too weak or because they possess other undesirable actions.

Here I may mention briefly one of these compounds whose action I have recently investigated. This is β methyl ζ-methylamino-β-γ-heptene. It is a straight chain compound having the formula



When injected intravenously in proper dosage and under favorable conditions, it will produce a great rise in blood pressure, which may last for from two and a half to three hours. The stomach and intestine are relaxed, as are also the bronchioles, while the pupils tend to dilate. It has been known for a quarter of a century that if any drug having an epinephrine-like action is injected into the blood it will very generally pick out some special organ or some particular set of sympathetic fibers on which it will act relatively more strongly than it does in other regions of the body. It would be a great help to practical medicine if a few drugs could be found which would thus exclusively and specifically act on only one or two organs. I believe there is a fair possibility that β-methyl ζ-methylamino-β-γ-heptene may be useful in this direction for relaxing the stomach and intestine in postoperative tympanites and possibly in some gynecologic conditions.

The carotid sinus and its associated structures have only recently been investigated. Largely through the work of Hering,[2] Koch [3] and especially Heymans [4] and his co-workers, we have been given a new conception of the regulatory action of this mechanism on the heart beat and blood pressure, on the respiration, and probably on a number of other functions. According to this newer work not only pressure variations within the carotid sinus but also drugs such as nicotine and even variations in the carbon dioxide and oxygen content of the blood may produce local reactions in the carotid sinus which, reflexly by way of the nerve of Hering and the medullary centers, will vary the heart rate, the respiration, and the like. It is probably too soon as yet to evaluate fully the significance these observations may have in such conditions as carbon monoxide poisoning, the introduction into the blood of ether, tribrom-ethanol in amylene hydrate, ethylene, arsphenamine, and the like, or acidosis or the low blood pressure of shock.

Only recently Dale [5] has coined the new terms "cholinergic" and "adrenergic" to define more clearly the functions of those groups of fibers of the general autonomic nervous system which he conceived to liberate either acetylcholine or epinephrine when nervous impulses reach the point at which these fibers terminate in the glands or smooth muscle fibers. Thus, the postganglionic parasympathetic fibers will liberate acetylcholine at their terminations, and atropine will stop or prevent the action of this acetylcholine on the nerve cells or muscle fibers because atropine, according to this view, acts on these cells or fibers directly and makes them insensitive to the action of the acetylcholine. And physostigmine serves to intensify the action of acetylcholine, which normally is rapidly destroyed in the tissues by an esterase, because the physostigmine uses up in its own hydrolytic destruction much of the esterase that would otherwise be left free to destroy the minute amounts of acetylcholine liberated. This temporary diversion of the esterase from the acetylcholine allows it to accumulate in larger quantities and thus produce greater pharmacologic effects.

Normal or artificially induced impulses descending over the vagus nerves may produce approximately normal contractions in the intestine after atropine. Dale [6] and Gaddum have suggested that in this and other similar instances "the nerve impulses liberate acetylcholine so close to the reactive structures that atropine cannot intervene, whereas it can prevent its access to them when it is artificially applied from without."

The true sympathetic nerves are considered to liberate epinephrine at their terminations. Cannon [7] and his co-workers believe that stimulation of sympathetic nerves liberates two substances, "sympathin E," which stimulates distant motor sympathetic nerve endings, and "sympathin I," which stimulates distant inhibitory sympathetic endings. Cocaine potentiates these effects.

In some instances fibers that belong anatomically to the true sympathetic system are cholinergic in action; e. g., the nerves to the sweat glands, and apparently some to the blood vessels, for in a normal animal acetylcholine dilates the arterioles, while after atropine it no longer has this effect.

Dale and his colleagues have obtained experimental evidence, which has been corroborated by others, that the passage of impulses from the endings of preganglionic fibers over to the ganglion cells of the postganglionic fibers is accomplished by the liberation of acetylcholine, probably in all instances, including both the true sympathetics and the parasympathetics.

Perhaps attention should be called to the older views and nomenclature for nerve endings, end plates, myoneural junctions, receptors, and the like. These have undergone considerable change since the beginning of this century, and it is probable that the newer conceptions of cholinergic and adrenergic fibers may necessitate some further modifications of present-day views. The anomalous action of certain nerves on the stomach, intestine and bladder after atropine, the prevention of the vasodilator effects of acetylcholine by atropine, the failure of some drugs to act on certain organs after nerve degeneration while other drugs remain active,

2. Hering, H. E.: Die Karotissinusreflexe, Dresden, Th. Steinkopff, 1927.
3. Koch, Eberhard: Die reflektorische Selbsteuerung des Kreislaufes, in Kisch, Bruno, editor: Ergebnisse der Kreislaufforschung, Dresden, Th. Steinkopff, 1931.
4. Heymans, Corneille: Le sinus carotidien et les autres zones vasosensibles réflexogènes, Paris, Presses Universitaires de France, 1929.
5. Dale, H. H.: J. Physiol. **80**: 10, P.. 1933.
6. Dale, H. H.: Brit. M. J. **1**: 835 (May 12) 1934.
7. Cannon, W. B.: Tr. A. Am. Physicians **48**: 236, 1933.

or may even show increased activity, all constitute problems on which further light is needed.

There are a great many instances in which drugs act profoundly on organs or structures that are innervated entirely by the autonomic nerves, and yet these nerves are not definitely known to be involved in the action. Histamine, posterior pituitary extracts (pitocin, pitressin), barium and nitrites are examples. The failure of some of these drugs to cause contraction of certain smooth muscles, the stimulation of secretion in some glands but not in others, relaxation of smooth muscles under certain conditions while the usual reaction is contraction, and various other obscure phenomena may very well lead one to suspect that these drugs really do have some action on nervous structures, although its limits cannot as yet be defined.

It is perhaps a matter of some significance that no one has been asked to speak specifically on the pathology of the autonomic nervous system in this symposium, for aside from the rather vague concepts of vagotonia and sympathicotonia one now hardly thinks of the autonomic nervous system as having any pathologic changes at all. Yet probably the greatest remaining interest that one might have in the action of drugs on the sympathetic system will lie in the matter of how much light these actions may throw on the etiology, nature and treatment of a variety of still obscure diseases. There are undoubtedly a number of diseases, or symptom complexes, that are largely, if not entirely, due to unusual failures or anomalous reactions of the autonomic nervous system. I may mention only a few of these to illustrate the very wide range of pathologic conditions on which the drugs I have been discussing may throw some light. Bronchial asthma, angioneurotic edema, hypertrophic rhinitis and urticaria will come to mind at once. Migraine has recently been treated with apparently considerable success by ergotamine tartrate, paroxysmal tachycardia has been promptly checked by subcutaneous injection of the ethyl ether of beta-methylcholine, and patients having myasthenia gravis have improved under the dimethyl carbamic ester of 3 hydroxyphenyl-trimethyl-ammonium methyl sulfate and five days ago Dr. H. E. Simon of Birmingham, Ala., reported two cases as apparently specifically relieved by injection of anterior pituitary extract. But conditions as diverse as hiccups and angina pectoris are undoubtedly largely dependent on pathologic reactions in the autonomic nervous system, even though it is not as yet understood how these symptoms are produced. One can hardly fail to suspect that the autonomic nervous system is specifically involved in such conditions as hyperpiesia, auricular flutter, some forms of peripheral vascular disease, acromegaly, paroxysmal tachycardia, leontiasis ossea, diabetes insipidus and some forms of gangrene, of which that produced in chronic ergot poisoning is an example. Possibly the recent isolation of ergmetrine in England by Dudley and Moir[8] and of ergostetrin by Thompson[9] in Baltimore and ergotocin by a group of Chicago workers[10] may ultimately throw some light on the latter condition.

8. Dudley, H. W., and Moir, Chassar: Brit. M. J. **1**: 520 (March 16) 1933.

9. Thompson, M. R.: The Active Principles of Ergot, report read before the Federation of American Societies for Experimental Biology, Detroit, April 11, 1933.

10. Davis, M. E.; Adair, F. L.; Rogers, Gerald; Kharasch, M. S., and Lagault, R. R.: A New Active Principle in Ergot and Its Effect on Uterine Motility, Am. J. Obst. & Gynec. **29**: 155 (Feb.) 1935. Ergotocin, Lancet **1**: 848 (April 6) 1935. The Active Oxytocic Principle of Ergot, editorial, J. A. M. A. **104**: 1910 (May 25) 1935. Ergotocin, Science, **81**: 388 (April 19) 1935.

INDICATIONS FOR OPERATIONS ON THE SYMPATHETIC NERVOUS SYSTEM

ALFRED W. ADSON, M.D.
ROCHESTER, MINN.

Indications for surgical treatment of diseases resulting from dysfunction of the sympathetic nervous system are based on the symptoms produced and the results obtained from interruption of the sympathetic pathways. The symptoms result from abnormal vasomotor stimuli and motor imbalances in the smooth musculature of the colon, sigmoid, rectum, bladder, ureters and uterus. Since afferent sensations of pain travel through fibers that may be of sympathetic origin and these fibers run parallel with the postganglionic fibers to blood vessels and visceral organs, pain also is considered a symptom resulting from dysfunction of the sympathetic nervous system.

The surgical treatment consists of sympathetic ganglionectomy and trunk resection, with section of rami and postganglionic fibers,[1] in order to interrupt completely sympathetic pathways carrying efferent and afferent stimuli to a given area or organ.

The relief of symptoms obtained by one of the surgical procedures in the treatment of diseases produced by excessive vasomotor constriction results from the increased flow of blood to the extremity or organ involved. The motor imbalance resulting in excessive retention of urine in the bladder or ureters, or the accumulation of feces as observed in congenital megacolon, is corrected by decreasing the stimuli by interrupting sufficient sympathetic fibers to balance the mechanism of retention with evacuation. Pain is relieved by the interruption of fibers carrying afferent sensations of pain, by increasing the flow of blood to the extremity or organ, and by relieving smooth muscle spasm. Though some of the sensations of pain travel along fibers in the sympathetic trunks, most of the relief obtained comes from the restitution of diseased tissue. The latter afferent impulse is carried directly over spinal nerves. Dysmenorrhea undoubtedly results from excessive vasomotor stimuli and muscular spasm. The relief obtained by resection of the presacral nerves is the result of interruption of nerve fibers carrying sensations of pain, vasomotor stimuli and motor stimuli to the uterine muscles.

PERIPHERAL VASCULAR DISEASES

Although there are a number of peripheral vascular diseases which develop as a result of, or are aggravated by, vasomotor spasm, it is imperative to analyze each group of diseases separately, since in some instances the symptoms are of such a mild character that medical management is adequate, whereas in others the disease has progressed to such a degree that, as a result of obliteration of principal and collateral arteries and

From the Section on Neurologic Surgery, the Mayo Clinic.

Owing to lack of space this article is abbreviated in THE JOURNAL. The complete article appears in the author's reprints.

Read before the Section on Pathology and Physiology at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

1. Adson, A. W.: Surgical Relief of Raynaud's Disease and Other Vascular Disturbances by Sympathetic Ganglionectomy and Perivascular Neurectomy, Ann. Clin. Med. **5**: 161-167 (Aug.) 1926; Cervicothoracic Ganglionectomy, Trunk Resection, and Ramisectomy by the Posterior Intrathoracic Aproach, Am. J. Surg. **11**: 227-232 (Feb.) 1931; Adson, A. W., and Brown, G. E.: Treatment of Raynaud's Disease by Lumbar Ramisection and Ganglionectomy and Perivascular Sympathetic Neurectomy of the Common Iliacs, J. A. M. A. **84**: 1908-1910 (June 25) 1925. Livingston, W. K.: The Clinical Aspects of Visceral Neurology, with Special Reference to the Surgery of the Sympathetic Nervous System, Baltimore, Charles C. Thomas, 1935.

destruction of tissue, little or no vasodilating effect can be obtained by sympathectomy.

Surgical treatment is instituted when medical treatment fails or when the disease is thus slowly progressing. It is not employed, however, until the patient has been carefully analyzed to determine the status of the remaining blood vessels. This is accomplished by carrying out vascular studies to determine by increased skin temperatures the vasodilating effects on the peripheral circulation in terms of blood flow. Vasodilating effects can be produced by nerve block, spinal anesthetic agents, induced fever, changes in the temperature of the skin from excessive covering,[2] and the administration of histamine or alcohol. In our experience at the clinic the most reliable test in determining the possibilities of vasodilatation have resulted from foreign protein therapy and the subsequent fever reaction.[3]

The electrodes of the electrothermocouple are fastened to various portions of the fingers, toes, hands, feet and body, in preparation for readings of surface temperature. Readings are first recorded of the temperature of the room and of the mouth and surface of the skin. Thus corrections can be made for the environmental temperature, and the temperature of the mouth and skin can be compared with the corresponding temperatures of a normal person and with the readings that are taken during the height of fever. The fever is produced by administering, intravenously, a foreign protein, such as from 5,000,000 to 75,000,000 dead bacilli in triple typhoid vaccine. The dose depends on the weight and sex of the patient. Hourly readings are made until maximal pyrexia has been obtained. These readings are compared with the initial temperatures to determine the ratios of increased temperature.

In studying the temperature of a normal person it will be observed that the temperature of the mouth may have increased as much as an average of 2 degrees C. (3.6 degrees F.), whereas the temperature of the skin over the digits will have increased from 4 to 6 degrees C. (7.2 to 10.8 degrees F.), or from two to three times more than the temperature of the mouth, indicating that the peripheral arteries have been opened by inhibition of the vasomotor center and that more blood has been permitted to flow to the periphery. In cases of a vasospastic disorder, Raynaud's disease, the difference in temperature is still greater because the initial surface temperature of the digits is lower than is that of a normal subject who is exposed to the temperature of the same room. In cases of general arteriosclerosis, there may be little if any difference in the temperature of the skin before and after administration of the foreign protein, indicating that the vessels are incapable of relaxing to allow an increase in the flow of blood to the periphery. In cases of thrombo-angiitis obliterans it is possible to determine whether or not there exists an element of vasomotor spasm of the collateral vessels and patent arteries; it is also possible by individual readings to determine the condition of each digit. Therefore the test serves as an index, and, unless the rise in temperature of the skin of the digits is two or more times greater than the rise of the oral temperature, the condition is considered inoperable. The test also permits determination of the degree of collateral circulation in different portions of the same digit.

Arteriography [4] has become a very useful aid in the differential diagnosis of peripheral vascular diseases, since the peripheral vessels appear attenuated in the vasospastic diseases and obstructed in the occlusive diseases. It also demonstrates the severity of the disease in the individual digits, which serves as an important prognostic factor.

Therapeutic tests from the induction of fever by the administration of proteins, bed rest and contrast baths also serve as important factors in selecting patients for sympathetic operations, since those who respond favorably to therapeutic tests will respond favorably to properly planned sympathetic ganglionectomy, trunk resection, and ramisection.[5]

RAYNAUD'S DISEASE

Raynaud's disease was not considered to be a vasomotor phenomenon until Raynaud [6] called attention to the local asphyxia and cyanosis that preceded gangrene.

Selection of Cases.—The real problem is to select suitable cases for sympathectomy and to decide when operation is indicated. The vasospastic phenomena may be intermittent or continuous. If the attacks are intermittent and mild, disturbing symptoms or trophic changes do not occur because complete recovery takes place between the attacks of vasomotor spasm. When the symptoms become continuous and interfere with normal activities of the patient and fail to respond to medical treatment, surgical procedures are instituted. It has been proved that vasodilatation results from section of vasomotor fibers carrying vasoconstrictor impulses, that the increase in temperature of the skin, produced by injections of foreign protein, can be reproduced by sympathetic ganglionectomy and by trunk resection, and that the increased flow of blood, measured by increased elimination of heat, continues and does not recede to the level at which it was before operation.

The relief of vasomotor spasm promptly results in an improvement in the circulation. The skin takes on a pinkish hue, asphyxia and cyanosis disappear, ulcers heal, and gangrene, if present, will soon show a line of demarcation and the necrotic tissue will loosen and slough away. Swelling and pain soon subside and recovery takes place. If the process is accompanied by scleroderma or sclerodactylia, the results are less satisfactory and recovery will be less prompt, since these two complications are manifestations of an extensive disease, which has resulted in obliteration of blood vessels because of loss of tissue and fibrosis in addition to the original vasospasm.

SCLERODERMA

The acral type of scleroderma [11] is the one that responds to sympathectomy. It is the scleroderma that results from the prolonged vasomotor spasm of Raynaud's disease. This acral type differs from the amorphous type in that the disease affects chiefly the skin over the hands, forearms, face, neck and scalp. Occasionally the disease involves the skin of the feet. Atrophy and contracting processes of the skin are asso-

2. Coller, F. A., and Maddock, W. G.: The Differentiation of Spastic from Organic Peripheral Vascular Occlusion by Skin-Temperature Response to High Environmental Temperature, Ann. Surg. **98:** 719-732 (Oct.) 1932.

3. Adson, A. W., and Brown, G. E.: The Treatment of Raynaud's Disease by Resection of the Upper Thoracic and Lumbar Sympathetic Ganglia and Trunks, Surg., Gynec. & Obst. **48:** 577-603 (May) 1929.

4. Allen, E. V., and Camp, J. D.: Arteriography: A Roentgenographic Study of the Peripheral Arteries of Living Subjects Following Their Injection with a Radiopaque Substance, J. A. M. A. **104:** 618-623 (Feb. 23) 1935.

5. Adson, A. W.: The Present Status of Surgery of the Sympathetic Nervous System, Proc. Inter-State Post-Grad. M. Assem. North America, Philadelphia, 1934, pp. 411-422.

6. Raynaud, Maurice: On Local Asphyxia and Symmetrical Gangrene of the Extremities, Selected Monographs, London, New Sydenham Society **7-10:** 1-150, 1888.

11. Brown, G. E.; O'Leary, P. A., and Adson, A. W.: Diagnostic and Physiologic Studies in Certain Forms of Scleroderma, Ann. Int. Med. **4:** 531-554 (Dec.) 1930.

ciated with similar processes in underlying structures, and it is not unusual for a patient to complain of motor weakness and inability to open the mouth or to protrude the tongue. Arthritic changes often become manifest in the fingers; this condition is referred to as sclerodactylia. The fact that sclerodermic changes are more pronounced in the skin of the uncovered parts, such as the hands, forearms, face and neck, than they are in the covered parts suggests that reflex stimuli of cold accentuate existing vasomotor spasm. The fact that underlying tissues are subject to atrophic changes suggests that vasospasm is not confined to the vessels of the skin but includes the vessels of the adjacent tissues.

Selection of Cases.—Care should be exercised in selecting patients with scleroderma for sympathectomy, for in advanced cases the hide-binding process has strangulated and destroyed the arterioles, capillaries and venules beyond repair.

The relief of symptoms depends directly on the duration of the disease and on its relation to the phenomena of vasomotor spasm. The patients who obtain the greatest relief are those who present the early stages of scleroderma of the acral type which follows a prolonged history of Raynaud's disease. It is characterized by puffiness of the hands, with tightness of the skin over the knuckles and a beginning limitation of motion of the finger joints. When this involves the skin of the face and neck, the patient will complain of tightness and thickness of the skin. The normal facial lines disappear, leaving a masklike expression. As the process continues, atrophy and contractures take place and radiating lines appear about the mouth. The muscles of the face and tongue become rigid and limit the free movements of mastication.

Various types of sympathectomy are not indicated unless the vascular studies demonstrate that there is ample circulation and the vessels are susceptible of being dilated by interruption of sympathetic pathways. Studies of the peripheral vessels of the extremities with thorium dioxide sol and therapeutic tests are valuable in determining the extent of disease and the condition of the vessels. Following operation in the early group the skin becomes pink, warm and elastic and the muscles again become fusiform and flexible, with resultant improvement in strength. Patients who have been unable to open their mouths or protrude their tongues are again able to masticate their food as formerly. The skin, however, still remains thin and bruises easily, and ankylosed joints are not changed.

The operation is not indicated in the advanced stages of the disease when the skin becomes adherent to the knuckles and loses all its subareolar tissue, leaving it so tight and hard that it appears like leather drawn tightly over the bony digits.

CHRONIC ARTHRITIS, RHEUMATOID TYPE

The appearance of cold, wet, clammy skin over the hands and feet of asthenic patients suffering from chronic polyarthritis [12] of the smaller joints suggested that a vasodilating operation would at least be as effective as the local application of heat and the administration of foreign protein. Cervicothoracic and lumbar sympathectomy have been employed for a variety of arthritic lesions, but these operations have been of value only in relieving symptoms and checking the disease in the small group presenting definite disturbances, of sympathetic origin, characterized by vasoconstriction and hyperhidrosis. These vasomotor disturbances are definite indications for surgical intervention when adequate medical measures have failed to check the disease. The operative treatment does not alter deformities, contractures, or the condition of ankylosed joints. It is of no value in the treatment of arthritic processes in the larger joints such as the knees, elbows, hips and shoulders. The operation is most effective in younger individuals and is contraindicated for infective and senile arthritis. The relief brought about by the improved circulation is not as sudden and dramatic as that obtained following the treatment of Raynaud's disease, but there does result a continued progress toward recovery.

ESSENTIAL HYPERHIDROSIS

Essential hyperhidrosis [12a] is a disease in which excessive perspiration of the hands or feet interferes with the normal social and economic status of an individual. Certain forms of sympathectomy are indicated for the ablation of the sweating function of localized areas when the individual complains of being socially ostracized and unable to carry on with his regular vocation. My patients, previous to operation, complained of excessive perspiration of the hands to such an extent that they have been unable to work with papers or books, to handle fine fabrics, or to wear gloves without ruining them. They have complained of the constant embarrassment of meeting strangers when they have had to offer their wet, sweaty hands in salutation. Younger individuals have shunned the opposite sex because emotional strain increased the symptoms and deprived them of the pleasures of social contacts, such as dancing. Constant perspiration of the skin on the palmar surface of the hands results in maceration and erosion of the epidermis to such an extent that it becomes painful to use the fingers. The hands of these people may be warm or cold, depending on the environmental temperature. Summer temperatures and emotional situations definitely aggravate the symptoms.

Operations employed for the relief of this complaint are similar to those employed for the relief of the vasoconstriction of blood vessels of the extremities in Raynaud's disease, since the postganglionic rami to the individual somatic segments are so intimately associated that it is impossible to separate one group of fibers from the other.[13]

The results following the operation are immediate and permanent. If the hands and face are involved, the skin promptly becomes dry and pink. The vasodilating effects produced by the operation are not contraindications. The skin does remain dry, and it is necessary that the patient apply hydrous wool fat ointment daily as is done following similar operations.

THROMBO-ANGIITIS OBLITERANS

Thrombo-angiitis obliterans [14] is characterized by vascular thrombosis of inflammatory origin that occurs in both arteries and veins, although not at the same

12. Henderson, M. S., and Adson, A. W.: Sympathetic Ganglionectomy and Trunk Resection in Arthritis: Indications and Results, J. Bone & Joint Surg. **14**: 47-56 (Jan.) 1932. Rowntree, L. G., and Adson, A. W.: Bilateral Lumbar and Thoracic Sympathetic Ganglionectomy and Ramisectomy for Polyarthritis of the Lower and of the Upper Extremities, Tr. A. Am. Physicians **44**: 221-230, 1929.

12a. Adson, A. W.; Craig, W. McK., and Brown, G. E.: Essential Hyperhidrosis Cured by Sympathetic Ganglionectomy and Trunk Resection, Tr. Western Surg. A., 1934, pp. 383-400.

13. Kramer, J. G., and Todd, T. W.: The Distribution of Nerves to the Arteries of the Arm, with a Discussion of the Clinical Value of Results, Anat. Rec. **8**: 243-255, 1914. Potts, L. W.: The Distribution of Nerves to the Arteries of the Leg, Anat. Anz. **47**: 138-143 (Aug. 3) 1914.

14. Buerger, Leo: Thrombo-Angiitis Obliterans: A Study of the Vascular Lesions Leading to Presenile Spontaneous Gangrene, Am. J. M. Sc. **136**: 567-580 (Oct.) 1908. Diez, J.: Angina Pectoris Treated by Resection of Cervical Sympathetic, Rev. Asoc. méd. argent. (Soc. Med. Int.) **37**: 591-598 (Dec.) 1924.

levels in each. Arterial thrombosis usually occurs in the main peripheral arterial channels, such as in the dorsalis pedis, posterior tibial, radial and ulnar arteries. In the more severe cases, arterial thrombosis ascends to include the popliteal and femoral arteries, and it may also occur in the brachial arteries. Venous thrombosis is more of the recurring type, and it may appear in any region of the foot, leg, thigh or arm. Arterial thrombosis is likely to affect the arteries of one leg more than those of the other; but, since the lesion has a tendency to progress and to spread, sooner or later it will affect the opposite extremity or the upper extremity. It also has been observed that, when there is occlusion of the principal arteries of one extremity, the arteries of the other extremity, though still patent, may show diminished pulsation.

Symptoms.—Thrombo-angiitis obliterans has a predilection for young, asthenic men, but it may affect robust men. Young asthenic women are occasionally afflicted. The initial symptoms usually consist of intermittent claudication on exertion of the muscles of the lower parts of the legs, but, as the disease progresses, pain is present even while the patient is at rest, and changes in color appear. The usual colors are those of rubor and cyanosis. They are accompanied by signs of passive congestion, swelling, localized phlebitis and occluded arteries. The changes in color are more prominent when the extremity is held in a dependent position and will disappear when it is elevated. The degree of collateral circulation can be determined clinically by the time that is required for the color to return when the extremity is lowered from a perpendicular to a horizontal position. Ulcers and gangrene appear in advanced stages of the disease.

Medical treatment consists of rest in bed, application of dry heat, the use of contrast baths, and intravenous injection of protein. This is the treatment that should be employed in early and mild cases. In view of experience in the treatment of vasospastic disorders such as Raynaud's disease by sympathetic ganglionectomy and trunk resection, selected patients of this group have been subjected to similar operations in order to improve the circulation of collateral vessels.

Selection of Patients for Sympathetic Ganglionectomy and Trunk Resection.—Before the introduction of the studies on induced fever I was compelled to operate without any particular method for the selection of patients, and I had to judge from results in previous cases whether or not a patient for whom the operation was contemplated would prove suitable. With the advent of studies of cutaneous temperature, better selections have been made possible. Brown and his collaborators have demonstrated repeatedly that a preoperative increase in skin temperature from vaccine therapy has been reproduced and maintained by ganglionectomy and trunk resection, which proves that vasomotor spasm of the collateral vessels has been relieved and that the circulation has been increased. The same criteria have been employed as those adopted in the selection of cases of Raynaud's disease. However, selection should not be based on this method alone, for it is unwise to operate on a patient during the period of extending arterial thrombosis; the danger is that thrombosis may ascend to include the femoral artery and may result in gangrene in spite of the operation. Those patients who present themselves with acute processes are placed in bed, under medical treatment, until the lesion has become quiescent. This may require from three to six weeks. Patients who have trophic ulcers or gangrenous digits are likewise treated medically, including administration of protein, until demarcation between healthy and diseased tissue appears and until healing of the ulcer begins; operation is then instituted. Occasionally it is wise to resect the thrombosed veins to hasten convalescence.

Results of Surgical Treatment.—The results of sympathetic ganglionectomy in properly selected cases of thrombo-angiitis obliterans are just as striking as those in cases of Raynaud's disease. Pain subsides, swelling disappears, and the ulcers heal with remarkable rapidity. Following operation, spontaneous amputation of the gangrenous digits usually occurs at a level much lower than that at which surgical amputation would have been performed. Vasodilatation and the improved circulation materially reduce the incidence of extending arterial thrombosis of the affected extremity, and they also reduce the incidence of such thrombosis in the opposite extremity. Intermittent claudication completely disappears in some cases; in others it is only diminished. The effect of interruption of vasomotor fibers to unoccluded and collateral arteries in cases of thrombo-angiitis obliterans is similar to that accomplished in the treatment of Raynaud's disease.

The comparative results of treatment revealed that, without adequate medical treatment, the incidence of amputation was 25 per cent; with medical treatment it was reduced to 14 per cent. Fifty-six per cent of the patients who were treated medically were markedly improved; the remainder were subjected to active recurrences. Eighty-three per cent of patients treated surgically returned to gainful occupations, and amputations of extremities were lowered to 4 per cent.

SPASTIC AND TROPHIC LESIONS

Spastic Lesions.—Royle,[15] in his attempt to relieve a spastic condition of the extremities by ramisection, is responsible for the renewed surgical interest in the sympathetic nervous system. Although the experimental and clinical work of Royle and Hunter appeared to be convincing, other investigators have failed to corroborate the existence of sympathetic innervation of striated muscles in mammals. The clinical results observed have been corroborated, but not to the extent that they hoped for. The reduction of spasticity in cerebral palsies is worth while in selected cases in which patients are mentally alert and free from tremors and for those whose condition is only moderately severe. The results are undoubtedly attributable to the increased supply of blood.

Osteoporosis.—Leriche [16] and a few other investigators believed that the improvement of the circulation by sympathectomy is of advantage in relieving the symptoms of osteoporosis. However, this opinion is not generally accepted and the problem still remains to be investigated.

Poliomyelitis.—Robertson [17] and others have shown by their investigations and operative results that extensive sympathectomies are of definite value in improving the circulation of the partially paralyzed extremity. They are especially effective in aiding the growth of the involved limb when it fails to keep pace with the opposite unaffected limb. Such operations promptly

15. Royle, N. D.: The Treatment of Spastic Paralysis by Sympathetic Ramisection, Surg., Gynec. & Obst. **39**: 701-720 (Dec.) 1924.
16. Leriche, René and Fontaine, René: Chirurgie du sympathique, Rev. neurol. **1**: 1046-1085 (June) 1929.
17. Robertson, D. E.: Sympathectomy in Children, Surg., Gynec. & Obst. **58**: 312-317 (Feb.) 1934.

relieve the cold, painful and unpleasant sensations. These surgical indications will undoubtedly induce additional surgeons to employ the procedure in the treatment in similar cases.

Trophic Ulcers.—Patients who have spina bifida occulta with neurotrophic changes occasionally have indolent ulcers on the soles. This condition is also associated with a vasomotor disturbance which is characterized by cold, wet, clammy skin on the extremities, and, since local heat has stimulated granulation and healing, lumbar sympathectomy has been employed very effectively in improving the circulation and healing of the ulcers. The procedure cannot be used indiscriminately, but it is indicated in selected cases in which hyperhidrosis and vasomotor spasm are present.

Causalgia and Painful Stumps.—Painful neuroma, a neuroma on the proximal end of a nerve caught in the amputation scar, does exist, but more often than not the situation of such pain is rather indefinite. Injuries of the palm and wrist in certain cases give rise to tender areas and to the projection of pain along the median nerve. The pain in amputated stumps is often indefinite in its situation. It appears to be projected into the absent hand or foot. Some of these pains are the result of traumatic neuritis, whereas others must be due to neuritis of the sympathetic fibers in the sheaths of blood vessels, for Flothow [18] has reported successful results following sympathetic ganglionectomy and trunk resection. My experiences have not been too gratifying, and I should therefore be cautious in advising sympathectomy. It is my impression that causalgia and painful stumps occur in cases in which patients have a low threshold to pain and are so psychologically constructed that they have difficulty in readjusting themselves to their infirmities.

ESSENTIAL HYPERTENSION

The sudden drops in systolic and diastolic blood pressure following the administration of spinal anesthetics [30] suggested the possibility that in the treatment of essential hypertension similar effects might be produced by operations that would denervate large vascular areas. Although the etiology of the disease is unknown, it is apparent that high blood pressure results from a fault in the neurovascular mechanism.[31] Hereditary [32] influences lend support to such a theory. It has been proved that suprarenal tumors, hyperthyroidism, eclampsia and numerous other lesions can produce an increase in pressure levels and also be responsible for sudden high rises above the mean pressure, which suggests that vasopressor substances within the blood are capable of producing an increased arterial tension. However, it has not definitely been proved that these substances act on the cerebral center alone or act on the musculature of the vascular system alone. Psychic factors and emotional stimuli are likewise capable of producing sudden peaks in the curve of blood pressure. These factors must either stimulate a vasomotor center or result in an excess secretion of vasopressor substances from the endocrine glands. Therefore, investigators have attacked the problem of essential hypertension by operative procedures on the thyroid and suprarenal glands and on the vasomotor nerves, from the sixth thoracic to the second lumbar.

Total ablation of the thyroid gland, according to Cutler, does not reduce the pressures materially. Crile [33] stated that denervation of the suprarenal glands offers but slight relief. Extensive resection of the suprarenal glands, according to DeCourcy and his associates,[34] offers some amelioration in the symptoms, but there is always the danger of the patient developing Addison's disease if too extensive a resection is performed.

Section of the splanchnic nerves,[35] on both sides, whether performed above or below the diaphragm, has produced some satisfactory results, but such an operative procedure does not thoroughly denervate the splanchnic vessels nor does it remove all the innervation to the suprarenal glands, since rami from the first and second lumbar nerves carry vasomotor fibers to the splanchnic vessels and innervate the suprarenal glands. I [36] proposed a procedure that Craig and I as well as Page and Heuer [37] have employed, which consists of laminectomy and rhizotomy of the ventral roots on both sides from the sixth thoracic to the second lumbar nerves, inclusive. This procedure was designed to include all the vasomotor fibers passing through the splanchnic nerves and the remaining lumbar white rami of the lower end of the sympathetic thoracolumbar outflow, to interrupt all central vasoconstrictor impulses to the vessels below the diaphragm and also to interrupt all central nerve impulses to the suprarenal glands, thus creating a vascular reservoir and preventing the suprarenal glands from suddenly dumping additional epinephrine into the venous blood. This procedure has produced some very satisfactory results, but on account of the extensive nature of the operation I have attempted to produce the same effects by sectioning the splanchnic nerves and removing the first and second lumbar ganglions, with the intervening trunks, through a high kidney incision, with resection of the twelfth rib, exposing the structures retroperitoneally. I have also combined this operation with resection of half the suprarenal glands. These last procedures are divided into two operations: carrying out resection of the splanchnic nerves, removal of the first and second lumbar sympathetic ganglions and resection of the suprarenal gland through one incision, and then performing a similar operation on the opposite side when the patient is thoroughly recovered from the first procedure. The results of the resection of the splanchnic nerves and removal of lumbar ganglions have apparently been just as effective as extensive rhizotomy.

Selection of Cases.—Though our experience extends over a period of four years, Brown, Craig and I have learned that the best results are obtained with young

18. Flothow, P. G.: Surgery of the Sympathetic Nervous System and Chronic Arthritis, Northwest Med. **29:** 518-522 (Nov.) 1930.

30. Emmett, J. L.: Subarachnoid Injections of Procaine Hydrochloride: The Quantitative Effects of Clinical Doses on Sensory, Sympathetic and Motor Nerves, J. A. M. A. **102:** 425-432 (Feb. 10) 1934.

31. Cannon, Bradford: The Effects of Progressive Sympathectomy on Blood Pressure, Am. J. Physiol. **97:** 592-596 (July) 1931.

32. Hines, E. A., Jr., and Brown, G. E.: A Standard Stimulus for Measuring Vasomotor Reactions. Its Application in the Study of Hypertension, Proc. Staff Meet., Mayo Clin. **7:** 332-335 (June 8) 1932.

33. Crile, George: Indications and Contraindications for Denervation of Adrenal Glands, Ann. Surg. **100:** 667-669 (Oct.) 1934.

34. DeCourcy, J. L.: Subtotal Bilateral Adrenalectomy for Hyperadrenalism (Essential Hypertension), Ann. Surg. **100:** 310-318 (Aug.) 1934. DeCourcy, J. L.; DeCourcy, Carroll, and Thuss, Otto: Subtotal Bilateral Suprarenalectomy for Hypersuprarenalism (Essential Hypertension) J. A. M. A. **102:** 1118-1122 (April 7) 1934.

35. Craig, W. McK., and Brown, G. E.: Unilateral and Bilateral Resection of the Major and Minor Splanchnic Nerves: Its Effects in Cases of Essential Hypertension, Arch. Int. Med. **54:** 577-596 (Oct.) 1934. Peet, Max: Personal communication to the author. Pieri, G.: La resezione dei nervi splancnici, Ann. ital. di chir. **6:** 678-684 (July) 1927. Rossi, Ferdinando: La resezione del tronco simpatico toracico e dei nervi splancnici nello spatium inframediastinale posterius, Arch. ital. di chir. **21:** 729-740, 1928; abstr. Zentralbl. f. Chir. **56:** 1334 (May 25) 1929.

36. Adson, A. W., and Brown, G. E.: Malignant Hypertension: Report of Case Treated by Bilateral Section of Anterior Spinal Nerve Roots from the Sixth Thoracic to the Second Lumbar, Inclusive, J. A. M. A. **102:** 1115-1118 (April 7) 1934.

37. Page, I. H., and Heuer, G. J.: A Surgical Treatment of Essential Hypertension, J. Clin. Investigation **14:** 22-26 (Jan.) 1935.

patients less than 40 years of age who have a history of short duration and of slow progression of the disease. Examination of the retinas reveals fairly accurately the state and progressive nature of the disease. In the earlier cases, vasospasm of the retinal arteries can readily be demonstrated, while in the advanced stages sclerotic changes, retinal hemorrhages and choked disks appear. Incomplete results and failures have occurred when operations have been performed in the presence of irreparable injury to the heart and kidneys. The average mean drop in systolic blood pressure has been 44 mm. of mercury, and a similar drop has been found in the diastolic pressure of 38 mm. The range of pressure levels and the high readings are materially lowered. The patients are promptly relieved of the violent headaches and cardiac discomfort on exertion.

RELIEF OF PAIN

As has been said, some of the relief of pain obtained in the treatment of peripheral vascular diseases is accomplished by interrupting afferent sensations which travel in fibers of the sympathetic group, whereas most of the relief undoubtedly comes from the restitution of diseased tissue. Occasionally an active neuritis is present which develops from ischemia of the nerve or a lesion of the nerve endings. When this occurs relief is not obtained by sympathectomy, and it is necessary in the milder cases to resort to section of sensory nerves and to an occasional amputation if chordotomy is not indicated.

Dysmenorrhea.—This most often occurs from endocrine disturbance but occasionally results from a disturbance of the sympathetic nervous system.[38] When this is true, it occurs in the asthenic individual who frequently complains of vasomotor disturbance, and it has been found to be associated with Raynaud's disease. The relief obtained by resection of the superior hypogastric plexus or presacral nerves undoubtedly is due to three factors; namely, section of fibers carrying afferent sensations of pain, section of fibers carrying excessive stimuli to the muscles of the uterus, and section of vasomotor fibers, which results in an increase of the blood supply of the uterus.

Selection of Cases.—Before advising and performing resection of the presacral nerves, the patient is advised to have endocrine studies and treatment in order to relieve the menstrual pain. If this fails, a diagnostic dilation and curettage is indicated unless the uterus is infantile. When all medical measures fail, laparotomy is performed, in conjunction with a gynecologic surgeon, further to rule out lesions that might be responsible for the dysmenorrhea. If none are found, the section of presacral nerves is performed, since it does not result in any postoperative sequelae nor does it interfere with pregnancy.

Splanchnic Pain.—This phase of sympathetic surgery is still in the investigative stage.[39] These pains may result from lesions within the abdominal viscera which are not relieved by the usual abdominal operation. Procaine block anesthesia has been employed as a diagnostic procedure in an attempt to select cases for splanchnic nerve resection. If anesthesia of the splanchnic nerves results in the sudden cessation of pain, one is justified in dividing them. I have operated in one such case, so far with excellent results, in which three operations had been performed for biliary disease and yet no stones nor active cholecystitis was found.

MOTOR IMBALANCES

Congenital Megacolon, Hirschsprung's Disease.—Hirschsprung's disease is presumed to be of neurogenic origin,[40] and in this condition the mechanism for filling the intestine, namely, the colon and sigmoid, is more powerful and overbalances the emptying mechanism. Thus it is apparent that the sympathetic outflow of inhibitory muscular stimuli to the colon and contracting stimuli to the internal sphincter of the rectum are more powerful than the parasympathetic motor stimuli to the musculature of the colon and inhibitory stimuli to the internal sphincter of the anus. Defective parasympathetic innervation produces a similar effect, since the emptying stimuli would be less than the filling and retaining stimuli.

In both congenital and acquired megacolon, dilatation of the colon will be of high degree with thickening of all tunics, especially the tunica muscularis, and with retention of large quantities of fecal matter. In Hirschsprung's disease the colon will be seen to be enlarged in a fusiform manner, and there is no evidence of any obvious obstructing bands, whereas in the acquired type of megacolon mechanical obstruction, in the form of bands, valvulae or adhesions, is usually found to account for the dilatations and compensatory hypertrophy above the obstruction.

Surgical Indications.—Surgical intervention, that is, sympathectomy, is not instituted in mild cases of Hirschsprung's disease in which medical treatment is adequate, but when it becomes necessary for the patient to return to the hospital more than two or three times for emptying of the colon, or for the employment of a still more rigid regimen, sympathectomy is indicated.

Scope of Operation.—In comparing the results following the various types of sympathectomy[41] it becomes apparent that the more advanced the disease the more complete must be the resection of sympathetic fibers in order to produce the results desired.

This observation prompted me to increase the scope of the operation still further, and it now includes resection of both lumbar trunks including the second, third and fourth lumbar ganglions, with wide resection of the superior hypogastric plexus or presacral nerves, which are situated on the promontory of the sacrum in the triangular space below the bifurcation of the abdominal aorta. This procedure is employed to include all the sympathetic fibers from the lumbar chain, all the intermesenteric fibers descending into the pelvis below the inferior mesenteric artery, and those fibers which rejoin the hypogastric plexus from the inferior mesenteric nerve in the mesocolon of the pelvis, thus leaving only a small group of fasciculi which have followed the inferior mesenteric artery and its branches to the lower part of the colon and to the internal sphincter of the anus.

38. Adson, A. W., and Masson, J. C.: Dysmenorrhea Relieved by Resection of Presacral Sympathetic Nerves, J. A. M. A. **102**: 986-990 (March 31) 1934. Leriche and Fontaine.[16]

39. Davis, Loyal; Hart, J. T., and Crain, R. C.: The Pathway for Visceral Afferent Impulses Within the Spinal Cord. II. Experimental Dilatation of the Biliary Ducts, Surg., Gynec. & Obst. **48**: 647-651 (May) 1929. Scrimger, F. A. C.: On the Possibility of Relieving Abdomial Pain by Section of the Sympathetic Rami Communicantes, Canad. M. A. J. **21**: 184-189 (Aug.) 1929.

40. Adson, A. W.: The Results of Sympathectomy in the Treatment of Peripheral Vascular Diseases, Hirschsprung's Disease, and Cord Bladder, Ann. Int. Med. **6**: 1044-1068 (Feb.) 1933. Judd, E. S., and Adson, A. W.: Lumbar Sympathetic Ganglionectomy and Ramisectomy for Congenital Idiopathic Dilatation of the Colon, Ann. Surg. **88**: 479-498 (Sept.) 1928. Gaskell, W. H.: Further Researches on the Vasomotor Nerves of Ordinary Muscles, J. Physiol. **1**: 262-362, 1878-1879.

41. Rankin, F. W., and Learmonth, J. R.: Section of the Sympathetic Nerves of the Distal Part of the Colon and the Rectum in the Treatment of Hirschsprung's Disease and Certain Types of Constipation, Ann. Surg. **92**: 710-720 (Oct.) 1930.

CORD BLADDER

Learmonth and Braasch [42] were the first to advocate presacral neurectomy for cord bladder and spasm of the neck of the urinary bladder. They based their contention on the fact that, when the bladder is incapable of emptying completely, as a result of injury to any portion of the parasympathetic pathway from traumatic myelitis, spinal meningitis, spina bifida or cord tumor, it seemed reasonable to suppose that the intact sympathetic contribution to vesical innervation [43] proved too effective a brake for the decreased parasympathetic innervation; Learmonth therefore resected the presacral sympathetic nerves in the hope of balancing the stimuli of emptying with those of urinary retention.

The same operation that was applicable to patients with urinary retention was applicable to those whose urinary flow was slow in starting as a result of spasm of the internal vesical sphincter, since the sympathetic system supplies the motor nerves to the sphincter muscles. Presacral neurectomy has become a useful procedure for both conditions. In the former it is essential that at least 50 per cent of the expulsive force be retained to assure a satisfactory result. This force can be determined by cystometric studies, cystoscopic examination, and the employment of acetylcholine and epinephrine. One would not advocate the operation for spasm of the vesical sphincter without the preliminary punch operation, since it frequently suffices to relieve the symptoms.

Dilated Ureters.—When this condition results from spasm at the entrance of the ureters into the bladder, it has likewise been relieved by presacral neurectomy.

POSTOPERATIVE CONVALESCENCE

The postoperative care and period of convalescence following the extensive forms of sympathectomy are similar to those following laparotomy. The mortality on the whole compares with that of simple appendectomy. The mortality is higher for thrombo-angiitis obliterans than for other peripheral vascular diseases and averages 2 per cent. This is due to the fact that venous emboli have become dislodged and also to the fact that there is extension of the disease to the coronary vessels. Dryness of the skin always follows operations for the relief of vasomotor spasm of the extremities. This sequela is not a serious handicap, since it has been pointed out that daily application of a hydrous wool fat ointment or theobroma oil is sufficient to relieve the discomfort. Presacral neurectomies, extensive rhizotomies, and sections of the splanchnic nerves with removal of the two upper lumbar ganglions result in the paralysis of the urogenital trigon and interfere with the ejaculatory powers of the male, but they do not disturb potency or the libido. These procedures interfere with virility, but they do not necessarily cause sterility. The occasional imperfect result obtained in the treatment of vasospastic diseases is due to incomplete operation, and this occurs most frequently with cervicothoracic sympathectomy, since it is very easy to overlook accessory fibers.[44] Sympathetic ganglions should be removed in conjunction with section of postganglionic rami whenever it is possible, for the preservation of the ganglion body with the postganglionic rami, even though the central connections have been severed, may have the property of exerting limited vasomotor influences. Horner's syndrome follows various forms of cervicothoracic sympathectomy, but the operation does not produce disfiguring symptoms when it is performed bilaterally.

42. Learmonth, J. R.: Neurosurgery in the Treatment of Diseases of the Urinary Bladder: III. The Treatment of Certain Types of Vesical Paralysis, J. Urol. **26**: 229-232 (Aug.) 1931. Learmonth, J. R., and Braasch, W. F.: Resection of the Presacral Nerve in the Treatment of Cord Bladder: Preliminary Report, Surg., Gynec. & Obst. **51**: 494-499 (Oct.) 1930.

43. Elliott, T. R.: The Innervation of the Bladder and Urethra, J. Physiol. **35**: 367-445, 1907.

44. Kuntz, Albert: Distribution of the Sympathetic Rami to the Brachial Plexus: Its Relation to Sympathectomy Affecting the Upper Extremity, Arch. Surg. **15**: 871-877 (Dec.) 1927.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. KUNTZ, DAVIS AND POLLOCK, BROWN, JACKSON AND ADSON

DR. W. J. MERLE SCOTT, Rochester, N. Y.: I think that, from the clinical standpoint, the central problem in this field with regard to the surgical attack on the autonomic nervous system is the working out of tests that will tell exactly, in advance of any operation or any other therapeutic measure, just what the relationship of the autonomic nervous system to the syndrome at hand is. The working out of these tests has given information that has raised problems that it has not been possible to clear up exactly, but it has added a great deal to the appreciation of the difficulties. Surgery in this field is experimental if by that phrase is meant that one doesn't know exactly what will be accomplished by the measure one is adopting. The experiment is primarily not that of the surgeon but that of nature. Essential hypertension will ordinarily kill the patient within three to five years, and, if a measure is available that will offer any degree of hope for these patients, I think that one is not only justified but also obligated to see what can be done with that measure.

DR. IRVING S. WRIGHT, New York: In tests for the determination of the degree of vasodilatation or vasoconstriction obtainable, the extent of temperature change depends largely on the temperature level before the experiment. It is important to recognize this because of the numerous charts that are published, through which the point is made that a rise of 12 or 15 degrees Fahrenheit is obtained by a given experiment. Patients may be stabilized at from 68 to 93 F. (temperature at finger tips), and naturally it is impossible to obtain as spectacular results in the way of dilatation from the individual who begins at the higher level. Dr. Charles Poindexter and I have been studying the reaction following the ingestion of alcohol, similar to the previous tobacco studies from our laboratory. One observation of considerable interest is that there are certain individuals who may ingest a given amount of alcohol without any evidences of vasodilatation, in whom the further addition of a relatively small amount of alcohol may produce as complete a dilatation as is obtainable without induction of fever. We have never obtained a temperature at the finger tips of more than 94 F. without fever (room temperature). It is important, therefore, when using alcohol in tests of vasodilatation, to keep in mind that certain individuals have a higher tolerance point that must be exceeded before any effect can be noted. The problem of surgery of the sympathetic nervous system is certainly an open question. We have had an opportunity to study, over a fairly protracted period of time, a number of the patients on whom ganglionectomy has been done for a variety of conditions. Even in the much advocated field of Raynaud's disease and scleroderma, certain patients show no improvement, and at the end of a year many are as badly off as if the disease had taken its usual course. In addition, the patient has been subjected to a very extensive operative procedure, with an average mortality of 4 per cent. In cases of scleroderma, when the back is even slightly involved, we have seen draining postoperative sinuses that have never healed. Our patients have been operated on by some of the outstanding advocates of surgery in this field. I should like to urge that the advocates of this type of operation for such a wide variety of conditions should continue to consider it an experimental procedure.

DR. JAMES C. WHITE, Boston: I have never had a failure, to date, after lumbar ganglionectomy for Raynaud's disease, but I think that many surgeons who have carried out complete sympathetic denervations of the upper extremity have seen

hands that still got cold and blue afterward. In this connection Drs. Smithwick, Freeman and I have thought of the fact, long known to physiologists, that denervated smooth muscle becomes sensitive to circulating hormones of the type of epinephrine and sympathin. If the iris in a cat's eye is denervated on one side only, a dose of epinephrine can be given that will have no effect on the normal eye but will cause wide pupillary dilatation and retraction of the nictitating membrane on the operated side. Tests were made on patients who had had sympathetic ganglionectomy with physiologic doses of epinephrine in a dilution of 1:250,000. These patients developed a clear-cut vasospasm. The same thing happens in the denervated rabbit's ear whenever the animal is excited and can be eliminated if the adrenals are inactivated. This physiologic response to epinephrine is one cause of the failures that all know exist. This effect is twice as marked in the arm as it is in the leg. In the leg it plays no clinical rôle, but in the arm it is a really important factor. In the relation of neurosurgery to visceral pain our particular problem has been that of angina pectoris, and three years ago with Drs. Garrey and Atkins I tested out all the possible neurosurgical procedures for the control of cardiac pain in dogs. We found that section of both vagi had no effect and, like Dr. Davis, that section of the intercostal nerves peripheral to the sympathetic rami would not stop that type of pain. Section of the upper five pairs of posterior roots or bilateral destruction of the upper four thoracic sympathetic ganglions would stop it. We have used these procedures on forty-five patients, and in every one in whom these fibers have been interrupted, either by alcohol injection, by ganglionectomy or by posterior root section, the pain has disappeared. I am convinced that relief of visceral pain is due to direct interruption of visceral afferent neurons which belong to the somatic system of nerves but which traverse the sympathetic trunks.

DR. E. L. JONES, Cumberland, Md.: I have been working in other sections for many years, and this fact fits in so nicely with everything that the physiologists are doing along the autonomic nervous system that I thought it would be given consideration in your field: There is a station of the autonomic system that goes into the eye, terminating in the ciliary muscle, the focusing muscle of the eye, and all manner of interferences with the free working of the autonomic nervous system can creep in through any station that puts it in contact with disturbing factors.

DR. CHARLES W. GREENE, Columbia, Mo.: I want to make some comparisons dealing with concrete autonomic coordinations of the coronary blood vessels and the heart that seem to be apropos. In Dr. Kuntz's diagram showing the nerves of the heart he gave only the general detail, but I have been working that field through new experiments, announced in only a preliminary way. A diagram shows the spread of the autonomic pathways of the neurons from the central axis through the sympathetic ganglions to the heart. Dr. Kuntz made a good point, that the ratio of spread runs in the neighborhood of one preganglionic neuron to thirty or more postganglionic neurons. I have found that the efferent accelerator and the coronary dilator pathways run as high as the superior cervical ganglions and as low as the sixth dorsal, neither of which has previously been shown for the coronary control. The nerves of the cardiac plexus are mixed nerves, in the upper branches consisting of cardiac accelerators and coronary dilators, and also inhibitor and coronary constrictor nerve fibers. Apropos of the classifications Dr. Kuntz is using, if vagosection is applied and degeneration obtained in this pathway, the inhibitor fibers can no longer be demonstrated physiologically, nor can the coronary constrictor fibers, showing obviously that these are of the vago-anatomic group, which anatomically should be considered parasympathetic. But these coronary constrictor fibers are not eliminated by atropine. They bear none of the usual earmarks of anything but thoracic vasoconstrictors, so I challenge the determination that one is dealing with parasympathetics. They have the physiologic characteristics of thoracic sympathetics, even though they run in a parasympathetic trunk, the vagus. Naturally, I take the physiologic basis of classification. Coronary dilatation on stimulating the peripheral right cervical vagosympathetic, the coronary effect of stimulating the superior cardiac nerve, showing coronary constriction before vagal operation, and dilatation after vagus degeneration—evidently a mixed pathway—can be demonstrated. A reflex dilatation of the coronaries occurs with not much change in blood pressure from sciatic stimulation. On stimulation of the splanchnic area there is a very remarkable reflex coronary dilatation. If the afferent fibers of the vagosympathetic containing sensory neurons arising in the lower thoracic region are stimulated, a reflex coronary dilatation occurs. Delicate reflex control of the coronaries rests on a richly developed autonomic mechanism.

DR. ALBERT KUNTZ, St. Louis: The terms "autonomic," "sympathetic" and "parasympathetic" were supplied by Langley, based on physiologic observations. These divisions have been found to be useful anatomically, and I think that at present they are more useful anatomically than physiologically. Dr. Greene has just pointed out that certain of the fibers to the heart which are included in the sympathetic supply act as though they were parasympathetic. The same thing could be pointed out in the vasomotor nerves to the peripheral vessels. The sympathetic vasomotor supply, as has been shown so clearly by Sir Thomas Lewis, contains both vasoconstrictors and vasodilators. These vasodilators always act as though they were parasympathetic. The vasoconstrictors are definitely adrenergic, if one wants to use such a term, and the vasodilators are cholinergic. Here one has the distinction between these two types physiologically, but the two divisions sympathetic and parasympathetic can no longer be kept distinct on a physiologic basis. I would still plead for these divisions, however, as good anatomic divisions, even though they did come from the physiologists. I would also point out that the literature would be much clearer if one terminology should be used and if afferent pathways were excluded from the autonomic system. It has been pointed out today that afferent pathways leading into the central nervous system may be very intimately associated with autonomic nerves, but they are cerebrospinal components.

DR. GEORGE E. BROWN, Rochester, Minn.: Whether vasodilatation is maintained and is persistent after sympathetic ganglionectomy and whether abolition of sweating gives misleading information on the increase in surface temperature can be answered with a good deal of assurance. Absence of sweating may be a factor, but there are other methods available for determining vasodilatation that seem conclusive. The rate of heat elimination, as determined by the hand or foot calorimeter, gives indirectly the volume flow of blood through the extremity. It has been shown with this method that huge increases in the rate of heat elimination and volume flow of blood are demonstrable in the sympathectomized limb years after the sympathetic ganglions are removed. The thermostromuhr method of Rein, as used in experimental studies by Drs. Herrick, Baldes and Essex, has indicated that the flow of blood in the femoral artery of the sympathectomized limb is 100 per cent or more greater than that in the femoral artery of the intact side. This increase was found a year after operation. After all, the clinical evidence is just as conclusive: the maintenance of hot, dry extremities, which have been observed as long as ten years after this operation, seems incontrovertible.

DR. ALFRED W. ADSON, Rochester, Minn.: I hoped that I had made it clear that none of our patients are submitted to sympathectomy without careful study in the medical departments. The study includes the routine examination and additional special examinations that have been devised to determine smooth muscle imbalances and vasomotor disturbances. These patients are not advised to undergo operative treatment unless medical measures are inadequate or unless the surgical results are known to exceed those obtained by medical treatment. I therefore believe that one is justified in advising and performing sympathectomy for Raynaud's disease, thrombo-angiitis obliterans, selected cases of scleroderma, rheumatoid arthritis of the smaller joints, Hirschsprung's disease, selected cases of cord bladder and dysmenorrhea, and essential hypertension. There are numerous other diseases that are under investigation and may ultimately be included in the group which are either materially improved or cured by sympathetic procedures. The whole field of the more recent extensive forms of sympathec-

tomy is still in its infancy. Postoperative observations may be changed as the survival period increases, which, if it does, will alter the surgical indications and the selection of cases. Close cooperation between laboratory investigators, clinicians and neurosurgeons is imperative in order to make the best selection of cases for surgery and to evaluate accurately the results obtained, whether they are failures or successes.

ASBESTOSIS

A. J. LANZA, M.D.
Assistant Medical Director, Metropolitan Life Insurance Company
NEW YORK

Asbestosis is a pneumoconiosis caused by the inhalation of asbestos dust. It is distinct from silicosis in its pathology and clinically. Whether asbestosis will remain a distinct form of pulmonary dust disease or will prove to be of a type common to a number of dusts remains to be seen. So far, it is the only pneumoconiosis, other than silicosis, that has received any considerable amount of study from pathologists, clinicians and industrial hygienists.

Whereas silicosis has been recognized for many centuries, asbestosis is a newcomer. Asbestos (Canadian) is a hydrated magnesium silicate containing no free silica but about 44 per cent of combined silica, 43 per cent magnesium, nearly 13 per cent of water, and traces of iron and nickel. While asbestos was known to the ancients, the fabricating of asbestos on a large scale is comparatively new; it received a tremendous impetus from its use in connection with automobiles and as an insulating material and a heat resistant for a great variety of mechanical purposes.

While Hoffman [1] called attention to the possible harmfulness of asbestos dust in 1918, it was not until February 1927 that asbestosis was, so to speak, officially recognized in this country by the filing of a disability claim for workmen's compensation in Massachusetts. The claimant was a foreman in the weaving department of an asbestos plant, and the claim was upheld by the Massachusetts Industrial Accident Board. This was twenty-seven years after the first fatal case was reported in England by Dr. Montague Murray. In 1910 and again in 1934 a fatal case was reported in England, and in 1928 the British Factory Department conducted an investigation and enacted laws for the protection and compensation of the worker against this hazard. The whole subject in England has been summarized by Merewether.[2] At the present time, as nearly as can be estimated, there are about 12,000 individuals employed in the chief asbestos plants in the United States, of whom 10,000 might be exposed to asbestos dust.

In 1927 a fatal case of uncomplicated asbestosis was reported to the Medical Society of South Carolina,[3] and since then, including this case, there have been eleven fatal cases reported in the United States, eight uncomplicated and three complicated by tuberculosis. These reports, together with the fact that asbestosis figured in the extraordinary occupational disease litigation that has spread over this country, resulted in both laboratory and field studies of this new hazard. Gardner and Cummings [4] at Saranac Lake, N. Y., commenced animal experimentation with asbestos in 1928 and reported their observations in 1931. These two authorities in the United States and Gloyne [5] in England have described the pathology. While silicosis is predominantly parenchymatous, asbestosis is mainly interstitial; nor is asbestosis characterized by the nodular formation so distinctive of silicosis.

A search of all the death records on file in the Metropolitan Life Insurance Company revealed that asbestosis had been given as a cause or contributing cause of death in only nineteen cases. The first case noted was in 1924, there were two in 1927, one occurred in 1931, and the rest have occurred since 1933. The diagnosis was supported by autopsy in only six. In one of the six the primary cause of death was carcinoma, in another glioma of the brain, and in another pulmonary tuberculosis. In the other three asbestosis was given as the primary cause, with cardiac failure as the contributing cause. Some of these cases were reported in the literature.

Asbestosis complicated by heart disease was given as the cause of death in seven cases. There were no autopsies in these seven and pulmonary tuberculosis was diagnosed in several by the attending physician, so perhaps too much weight cannot be given to these certificates.

Diabetes and pulmonary tuberculosis were also mentioned in the remaining six cases, in which there were no autopsies. All nineteen patients were males and with one exception all were white.

In our studies of asbestos mines and fabricating plants,[6] the clinical picture of asbestosis was milder than that of silicosis. To be sure, the individual patient with marked asbestosis will greatly resemble the individual with silicosis. There is the same dyspnea on exertion, the same dry cough, and the more or less indefinite physical signs elicited by the stethoscope. The patient with asbestosis is apt to have clubbed fingers—not usually seen in silicosis—and he is apt to be pasty faced and even show a slight cyanosis, while the silicotic patient is apt to be fairly robust looking. Of course, in each instance I refer to patients whose disease is not complicated by infection.

We did not find in communities in which asbestos was mined or fabricated the familiar picture of disability and tuberculous infection so characteristic of hard rock mining communities. Our observations were supported by the statements of physicians practicing in these communities. All the patients with asbestosis that we detected were, with one exception, working steadily at their trades. In only one case did we find evidence of active tuberculosis and that diagnosis was based only on the roentgen appearance. Several showed healed tuberculosis. Gardner and Cummings in their reports called attention to the difference between the action of asbestos dust and silica dust in relation to tubercle infection in experimental animals, and their observations tend to bear out our clinical study.

In all, our clinical data are based on 126 physical examinations of asbestos workers, all of whom had more than three years' exposure and who were selected at random. Sixty-three of these presented a roentgen appearance which we thought indicated a pneumoconi-

Read before the Section on Preventive and Industrial Medicine and Public Health at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

1. Hoffman, F. L.: Mortality from Respiratory Diseases in Dusty Trades, Bull. 231, U. S. Department of Labor, June 1918.
2. Merewether, E. R. A.: A Memorandum on Asbestosis, Tubercle **15**: 69 (Nov.), 109 (Dec.) 1933; **15**: 152 (Jan.) 1934.
3. Lynch, K. M., and Smith, W. A.: Pulmonary Asbestosis, Am. Rev. Tuberc. **23**: 643 (June) 1931.
4. Gardner, L. U., and Cummings, D. E.: Studies on Experimental Pneumonokoniosis: VI. Inhalation of Asbestos Dust: Its Effect upon Primary Tuberculous Infection, J. Indust. Hyg. **13**: 65 (Feb.) 1931.
5. Gloyne, S. R.: The Morbid Anatomy and Histology of Asbestosis, Tubercle **14**: 445 (July), 493 (Aug.), 550 (Sept.) 1933.
6. Lanza, A. J.; McConnell, W. J., and Fehnel, J. W.: Effects of the Inhalation of Asbestos Dust on the Lungs of Asbestos Workers, Pub. Health Rep. **50**: 1 (Jan. 4) 1935.

osis, but the symptoms were indefinite and inconclusive. We called these cases first stage. Four presenting evident pulmonary symptoms and corroborative roentgenograms, we termed second stage. Of these sixty-seven patients, twenty had been exposed more than ten years and thirteen more than fifteen years. We are still continuing our asbestos studies and hope to secure additional information on the time element in development and the tendency and rate of progress.

One feature that has impressed us is that the British investigators found asbestosis more severe and more menacing than we did. This difference may be more apparent than real, but it is possible that the English factories may be more dusty than ours. There were not available any comparative dust counts, but this impression is based on their reports and on statements made to myself and my colleagues by persons familiar with the English conditions. One process, described in the British reports as "mattress making" and stated to be extremely dusty, does not appear to have a counterpart in this country. In both countries, energetic steps have been taken to control the dust hazard in asbestos plants, so that it is probable that further cases of disabling asbestosis will be rare.

As in silicosis, the diagnosis centers on the roentgenogram. However, the whole matter of attempting to interpret these films and correlate them with the clinical evidence, if any, is difficult and elusive. If, in our studies, we had found a more clear-cut and severe type of pneumoconiosis with marked symptoms and disability as well as a distinctive roentgen appearance, such as my colleagues and myself had been accustomed to find in our previous investigations of silicosis, our task in attempting to make a positive diagnosis and estimate the extent of the disease would have been easier. There is no doubt that, especially in the beginning, we were handicapped by endeavoring to evaluate asbestosis with a silicosis foot rule.

The x-ray appearances are not clear cut or distinctive as in silicosis and do not lend themselves to ready grouping into progressive stages. There are less evident pathologic changes in these films and the shadows are finer, more granular and softer than in silicosis. The asbestosis film gives the impression of ground glass, and there is no nodulation with the consequent tendency of the nodules to coalesce and give dense opaque areas in the films. The distribution of the shadows is somewhat different, occupying the lower third of the lung, except in far advanced cases, when the shadows may occupy the major portion of the lung. We noticed frequently the well marked outline of the interlobar septum on the right side. We also noticed that a number of films in cases of asbestosis showed enlarged hearts, and this might be expected when one considers that the pathologic process tends to constrict the pulmonary blood vessels as they ramify along with the bronchioles.[7]

It is possible that the x-ray appearance of asbestosis may not be distinctive of this disease alone but uniform in appearance with pneumoconiosis due to other silicate dusts. Much more investigation and study of roentgenograms of industrial workers exposed to all sorts of silicate and other dusts are needed before it will be possible to speak definitely on this, the most important phase of the diagnosis of pneumoconiosis.

One thing is certain. The utmost care and patience are needed to elicit the occupational history of the patient and to correlate this and the clinical picture with the roentgenogram before a diagnosis of asbestosis is justified. As noted in relation to other occupational health hazards, there is an all too frequent tendency to make a diagnosis of a specific occupational disease because of presumptive or actual exposure without the corroboration of other essential factors to a correct diagnosis. One is not justified in making a diagnosis of asbestosis any more than of silicosis in the presence of a roentgenogram showing no distinctive pulmonary pathologic changes.

Associated with exposure to asbestos dust is the occurrence in the sputum and pulmonary tissues of a peculiar formation known as asbestos bodies. These asbestos bodies have been described by a number of observers and are due apparently to the action of the tissues on the asbestos fiber. Their exact significance is doubtful, but it is commonly agreed at the present time that they are not diagnostic of pulmonary fibrosis and indicate merely that the individual has been exposed to asbestos dust.[8] Some observers believe that, when these asbestos bodies appear in the sputum in clumps, they indicate actual disintegration of lung tissue.

Dr. Miller[9] of the United States Public Health Service describes the technic that he employs in the intraperitoneal injection of finely divided dusts in a state of suspension. Miller defined three types of reaction: absorptive, inert and proliferative. The first is produced by relatively harmless or inactive dusts, the second by dusts that might cause pulmonary fibrosis, and the third as the typical reaction of silicosis. Recently Miller[10] described the effects of the injection of three varieties of asbestos; namely, chrysotile, crocidolite and amosite. Chrysotile is Canadian asbestos and, as previously stated, is largely magnesium silicate. Crocidolite and amosite contain only a small quantity of magnesium, containing instead iron silicate in approximately the same quantity.

The three types of asbestos produced the same type of reaction; namely, the one described by this investigator as inert. He states:

> We have been assuming that the dusts producing this inert reaction cause pneumoconiosis of the diffuse fibrosis type as distinct from the proliferative reacting dusts which cause nodular fibrosis. This assumption, as you know, has not been proven by corresponding animal experiments with the same dusts, but results from observation of pathologic material from autopsies. . . . I believe that the gross behavior of asbestos in the tissues has further strengthened the value of our classification of dusts and the intraperitoneal test as a means of determining the harmful dusts by its clinical correlation.

Much work remains to be done before asbestosis is spoken of as authoritatively as is silicosis. In the meantime, asbestos plants are being cleaned up and the dust is being controlled. This, together with the smaller number of persons employed, implies that there will probably never be the wealth of clinical material that has been available in silicosis. It is by no means certain that asbestosis progresses as does silicosis after withdrawal from dust exposure, nor does infection seem to be as closely and intimately associated with asbestosis as with silicosis. The answer to these and other problems resulting from exposure to silicate dusts demands further study both in the field and in the laboratory.

Metropolitan Life Insurance Company.

7. Dubrow, J. L., in discussion of McCann, W. S.; Hurtado, Alberto; Kaltreider, Nolan, and Fray, W. W.: The Estimation of Functional Disability in the Pulmonary Fibroses, J. A. M. A. **103**: 810 (Sept. 15) 1934.

8. Merewether.[2] Wood, W. B., and Gloyne, S. R.: Pulmonary Asbestosis, Lancet **2**: 1383 (Dec. 22) 1934.

9. Miller, J. W., and Sayers, R. R.: The Physiological Response of the Peritoneal Tissue to Dusts Introduced as Foreign Bodies, Pub. Health Rep. **49**: 80 (Jan. 19) 1934.

10. Miller, J. W.: Personal communication to the author.

BIOLOGIC EFFECTS OF PINEAL EXTRACT (HANSON)

AMPLIFICATION OF EFFECTS IN THE YOUNG RESULTING FROM THE TREATMENT OF SUCCESSIVE GENERATIONS OF PARENT RATS

L. G. ROWNTREE, M.D.
J. H. CLARK, M.D.
ARTHUR STEINBERG, B.S.
PHILADELPHIA
AND
A. M. HANSON, M.D.
FARIBAULT, MINN.

Because of the pathognomonic syndrome observed in young individuals affected with pineal tumors, clinicians are always keenly interested to learn something new concerning the function of the pineal gland. To date, however, this has remained one of nature's best guarded secrets.

This gland has been known since ancient times. Galen wrote "It is in substance glandular. . . . It was devised for the same purpose as other glands of the body." Descartes regarded it as the seat of the soul. In some lizards it becomes highly specialized and may have functioned at times as a rudimentary eye. Modern science has met with but meager success in the study of this gland and left us still in doubt as to whether the pineal gland is a vestigial structure or a functioning endocrine gland. Excellent collective reviews have been presented by McCord [1] in 1917 and Andersen and Wolf [2] in 1934.

In human beings the pineal gland is a cone-shaped structure on the superior colliculi of the corpus callosum. It develops in size during childhood until the age of 7 (or possibly puberty), at which time it undergoes some form of involution. It attains a weight of from 0.10 to 0.15 Gm. It persists throughout life and in late years is filled with "brain sand." It is not essential to life.

According to Bailey [3] the pineal body is attached by a short stalk to the posterior boundary of the dorsal surface of the third ventricle. It rests on the midbrain, is dark red and measures about 6 mm. long and 4 mm. broad. Careful studies have failed to reveal any sex difference.[4] It makes its first appearance during the fourth or fifth week of development as an outpouching of the roof of the diencephalon. It is formed first of ependyma only, but the walls soon thicken and mesodermal elements become included. It develops from ectoderm that possesses sensory rather than internal secretory potencies. In the fully developed condition the pineal body consists of scattered ependymal cells in a framework of neuroglia and connective tissues. The ependymal cells tend to be ranged in lobules. Within the lobules cystlike structures may be recognized and a variable amount of acervulus, or brain sand, is encountered. They contain a good deal of pigment, as well as some lipoid inclusions and typical mitochondria. No secretion antecedents have been found.

Biologic studies on the pineal gland have concerned themselves chiefly with the effects in various types of small animals of extirpation of the gland, feeding experiments, transplants and the administration of various forms of pineal extract. Pinealectomy in the hands of many investigators has led consistently to negative results in the rat,[5] in the rabbit,[6] in the dog [7] and in the chick.[8] On the other hand, positive results have been claimed in the rat by Izawa [9] and Yohoh,[10] in the guinea-pig by Horrax [5] and Clemente,[11] in the rabbit by Clemente,[11] in the dog by Sarteschi,[12] and in the chick by many workers.[13] The most common result of pinealectomy is said to be "premature development of secondary sex characters in the male, enlargement of the gonads, overgrowth of the body and obesity." Andersen and Wolf,[2] after a critical analysis of the several papers submitted, expressed the opinion that, generally speaking, the data submitted do not justify the conclusions reached.

Feeding experiments have been carried out by McCord [1] on 400 young animals, using fresh pineal glands, with resulting early precocity and adiposity. Hoskins's [4] results in experiments on small animals were almost completely negative.

Implantation of the pineal gland has been attempted in chicks with negative results by Kozelka.[14] Increased rate of growth in rabbits has been claimed by Dubowik.[15] In the rat Lahr [16] found no influence on body growth of either sex but retardation of gonadal development in both male and female.

Injection of pineal extract was tried by VonCyon,[17] Howell,[18] Boese and Exner,[19] Dana and Berkeley,[20] Fenger [21] and Cushing,[22] all with negative results. Immediate pharmacologic effects in the nature of lowered blood pressure were noted by Jordan and Eyster,[23] Horrax,[5] and Dixon and Halliburton.[24] The latest contribution to the subject is from Engel.[25] He has found an antagonism of pineal extracts toward

Read before the Section on Pharmacology and Therapeutics at the Eighty-Sixth Annual Session of the American Medical Association, Atlantic City, N. J., June 13, 1935.

From the Philadelphia Institute for Medical Research, the Samuel Bell Jr. Laboratory in the Philadelphia General Hospital, the Laboratories of the Philadelphia General Hospital and the Hanson Research Laboratory, Faribault, Minn.

This work was supported by a grant from the Penrose Fund of the American Philosophical Society. We wish also to acknowledge with gratitude the financial assistance given one of us, Dr. Hanson, by the Josiah Macy Jr. Foundation.

1. McCord, C. P.: The Pineal Gland, Surg., Gynec. & Obst. **25:** 250 (Sept.) 1917.
2. Andersen, D. H., and Wolf, A.: J. Physiol. **81:** 49 (March) 1934.
3. Bailey, in Cowdry, E. V.: Special Cytology, ed. 2, New York, Paul B. Hoeber **2:** 789, 1932.
4. Hoskins, E. R.: The Tides of Life, New York, W. W. Norton & Co., 1933, p. 236.
5. Foa, C.: Nouvelles recherches sur la fonction de la gland pinéale, Arch. ital. de biol. **61:** 79, 1914; Hypertophie des testicules et de la crete apres l'extirpation de la gland pinéale, ibid. **67:** 233. Horrax, Gilbert: Studies on the Pineal Gland, Arch. Int. Med. **17:** 607 (May) 1916. Kolmer, W., and Löwy, R.: Arch. f. d. ges. Physiol. **196:** 1, 1922. del Castillo, E. B.: Compt. rend. Soc. de biol. **99:** 1404 (Nov. 9) 1928. Renton, A. D., and Rushbridge, H. W.: Proc. Soc. Exper. Biol. & Med. **30:** 766 (March) 1933. Andersen and Wolf.[2]
6. Exner, A., and Boese, J.: Ueber experimentelle Extirpation der Glandula pineale, München. med. Wchnschr., 1911, No. 3, p. 154.
7. Dandy, W. E.: Extirpation of the Pineal Body, J. Exper. Med. **22:** 237, 1915.
8. Badertscher, J. A.: Anat. Rec. **28:** 177, 1924.
9. Izawa, Y.: Am. J. M. Sc. **166:** 185 (Aug.) 1923; Am. J. Physiol. **77:** 126 (June) 1926.
10. Yohoh, cited in Hoskins.[4]
11. Clemente, G.: Endocrinol. e pat. costit. **2:** 44, 1923.
12. Sarteschi, U.: Sindrome epifisarsaria macrogenitosomia praecox, Pathologica **5:** 707, 1913.
13. Foa,[5] Zoia, C.: Ztschr. f. allg. path. Anat. Rec. **25:** 789, 1914. Clemente.[11]
14. Kozelka, A. W.: Proc. Soc. Exper. Biol. & Med. **30:** 842-844 (April) 1933.
15. Dubowik, J. A.: Endocrinologie **11:** 15, 1932.
16. Lahr, E. L.: Tr. Kansas Acad. Sc., vol. 35, 1932.
17. VonCyon, E.: Zur Physiologie der Zirbeldrüse, Arch. f. d. ges. Physiol. **98:** 327, 1903.
18. Howell, W. H.: The Physiologic Effects of Extracts of the Hypophysis Cerebri and Infundibular Body, J. Exper. Med. **3:** 245, 1898.
19. Exner, A., and Boese, J.: Neurol. Centralbl., 1910, p. 754, footnote 6.
20. Dana, C. L., and Berkeley, W. N.: The Function of the Pineal Gland, M. Rec. **83:** 835, 1913.
21. Fenger, Frederic: The Composition and Physiologic Activity of the Pineal Gland, J. A. M. A. **67:** 1836 (Dec. 16) 1916.
22. Cushing, Harvy, cited by Bailey and Jeliffe.[30]
23. Jordan, H. E., and Eyster, J. A. E.: The Physiologic Action of Extracts of the Pineal Body, Am. J. Physiol. **29:** 115, 1911.
24. Dixon, W. E., and Halliburton, W. D.: The Pineal Body, Quart. J. Exper. Physiol. **2:** 283, 1909.
25. Engel, P.: Wien. klin Wchnschr. **48:** 481 (April 19) 1935.

the growth hormone of the anterior lobe of the hypophysis and toward the hormone affecting luteinization and maturation of the follicles.

McCord [1] called attention to the effect of pineal extracts on the melanophores; the production of silver colored tadpoles and the increased rate of multiplication of paramecia, results concurred in by Adair and Chidester.[26] McCord [1] further called attention to the

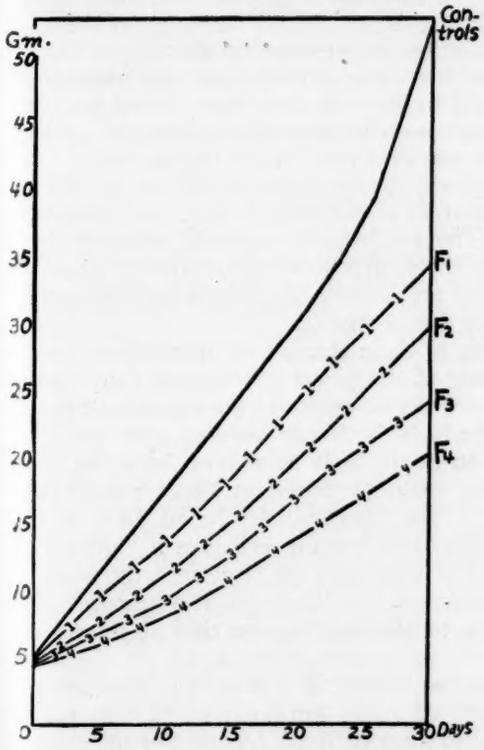


Fig. 1.—The number of rats constituting the basis for the weight curves is as follows: for the controls, 301 rats; for the F_1 generation, 138 rats; for the F_2 generation, 543 rats; for the F_3 generation, 155 rats; for the F_4 generation, 41 rats.

paradox appearing in the literature; namely, that extirpation of the gland leads to "precocity of development," while the administration of the pineal gland in excess to the young leads essentially to the same result by "hastening growth and sexual maturity."

CLINICAL CONSIDERATIONS

The clinical aspects of the pineal gland are of peculiar interest. The possibilities of a specific pathognomonic pineal endocrine clinical picture in tumors of this gland was first suggested by Frankl-Hochwart [27] and developed by Marburg [28] and Pellizzi.[29] It is now a fairly well established clinical entity, but the significance of the so-called endocrine feature is not at all clear. Pineal tumors are usually associated with general signs of compression, neighborhood manifestations and at times the so-called endocrine picture. The signs and symptoms of generally increased intracranial pressure are headache, vomiting, convulsions and the like. The localizing neighborhood neurologic manifestations result mostly from encroachment on the quadrigeminal bodies leading to pupillary changes and strabismus; the effects of pressure on the cerebellar and pyramidal tract are seen at times, and very often the clinical picture of hydrocephalus develops, leading to general signs of compression. Finally there is the syndrome supposedly pathognomonic of pineal tumor, the pineal endocrine manifestations consisting of overgrowth, mental precocity, precocious sexual development, and macrogenitosomia praecox, as evidenced by enlargement of the penis and testes, the early appearance of pubic and axillary hair, change in the voice and early gonadal functions (erections and the like). The clinical manifestations of adiposity, polyuria, polydipsia and drowsiness are usually considered as secondary hypopituitary states. It is of interest that the specific pineal endocrine features seem to be largely confined to the male. Originally thought to be confined to teratomas, they are encountered in types of pineal tumors diagnosed as sarcomas, gliomas, psammomas, carcinomas and cysts.

The cause of the precocious sexual development, according to Bailey and Jelliffe,[30] who have made a comprehensive study of pineal tumors, is not evident. Thus Oesterich and Slawyk [31] are inclined to regard it as evidence of hyperpinealism in just the same sense that acromegaly is the result of an excess of pituitary hormone. In this connection Askanazy [32] believes that an increase in pineal secretory function might well be expected in teratomas originating in the pineal body. Others, however, regard these clinical manifestations as evidence of hypopinealism.[33] It has further been suggested that mechanical pressure may be the responsible factor, and that precocious sexual development may be an "early irritative sign of a purely nervous character, acting through the pars nervosa sympathetic system." Cushing [22] assumes that dyspituitarism resulting from pressure on the infundibulum might explain the sexual changes.

From the foregoing it is evident that unanimity of opinion is lacking relative to the rôle of the pineal gland in biology and to the part it is playing in the clinical picture in tumors of this gland. One group believes that the pineal gland produces a secretion which inhibits

Fig. 2.—Comparative size of control rat (at left) and rat under pineal treatment (at right). The control rat, aged 14 days, weighs 23 Gm.; the fifth generation of rat under pineal treatment, same age, weighs 9 Gm.

the growth of the body and restrains mental and sexual development, while others, especially McCord,[1] have contended that the pineal gland stimulates growth and

26. Adair, J., and Chidester, F. E.: The Influence of Pineal Feeding upon the Rate of Metamorphosis in Frogs, Endocrinology **12**: 791 (Nov.-Dec.) 1928.
27. Frankl-Hochwart: Ueber Diagnose der Zirbeldrüsentumoren, Deutsche Ztschr. f. Nervenh. **37**: 455, 1909.
28. Marburg, O.: Die Klinik der Zirbeldrüsekrankungen, Ergebn. d. inn. Med. u. Kinderh. **10**: 146, 1913.
29. Pellizzi, G. B.: Riv. ital. di neuropat. **3**: 193, 1910; Lavori d. Ist. di clin. med. d. r. Univ. di Pisa **2**, 1910.
30. Bailey, Pearce, and Jelliffe, S. E.: Tumors of the Pineal Body, Arch. Int. Med. **8**: 851 (Dec. 15) 1911.
31. Oesterich and Slawyk: Riesenwuchs und Zurbekdrysengeschulst, Arch. f. path. Anat. **157**: 475, 1899.
32. Askanazy, M.: Teratom und Chorion épithelium der Zurbeldruss, Verhandl. d. deutsch. path. Gesellsch., 1906, p. 58.
33. Pellizzi.[29] Schüller, A.: Handb. der Neurol. **4**: 337, 1913. Frankl-Hochwart.[27]

also sexual and physical precocity. On the clinical side one group ascribes the endocrine feature of pineal tumors to underfunction and the other to overactivity of the gland.

EFFECTS OF ADMINISTRATION OF PINEAL EXTRACT (HANSON) THROUGH SUCCESSIVE GENERATIONS OF RATS

The success attending our studies with the continuous administration of thymus extract (Hanson) to successive generations of parent rats, resulting in the remarkable precocity in the offspring in the third and succeeding generations, led us to attempt the same procedure with an extract of the pineal gland. A small colony of four pairs of albino rats (Wistar strain) was started on pineal extract, March 2, 1934. Test animals have been subjected to date to 1 cc. daily, of pineal extract intraperitoneally, even during periods of pregnancy and lactation. Offspring born to these rats have been mated in pairs, and these likewise have been so treated and the effects of pineal extract on parents and offspring noted. The procedure has resulted in a definite effect on the rate of growth and development in the offspring, the effect becoming more pronounced as each succeeding generation is born to treated parents.

The extract employed most frequently (PB_{22}) was one of several prepared by Hanson. It represents an

Progressive Development Under Pineal Treatment

Controls	Ears Opened	Teeth Erupted	Fur Appeared	Eyes Opened	Testes Descended	Vagina Opened
	2½-3½ (3)	8-10 (9.0)	16 16	14-17 (15.5)	31-40 38	55-72 65
F_1	2-3 (3.3)	8-10 (9.0)	7-16 (13.0)	12-17 (14.9)	12-36 (22.0)	32-56 (45.0)
F_2	2-3 (2.8)	7-11 (9.0)	6-17 (12.0)	12-16 (13.8)	6-26 (15.0)	30-39 (37.0)
F_3	2-3 (2.3)	5-8 (6.9)	5-12 (9.0)	5-13 (9.8)	5-12 (10.0)	29-39 (32.0)
F_4	1-3 (2.0)	3-5 (4.0)	4-8 (5.0)	4-8 (6.0)	4-9 (5.0)	23-26 (24.0)

aqueous acid derivative, probably in the form of a picrate, and containing 0.21 per cent free trinitrophenol (picric acid). It is relatively nontoxic but somewhat irritant locally. One cannot, however, escape the impression that it is somewhat of a deterrent to the general good health of the rats in the experiments herein described. To date more refined extracts seem to lack the activity apparent in PB_{22}. Further studies in this field are in progress.

To date five successive generations of the pineal strain of rats have been under observation. An analysis of the biologic data of each of these generations reveals several significant facts. In the first generation no effect is apparent other than moderate loss of weight, phenomena suggestive of sex excitation, as increased size of penis, and early breeding. In the second generation there is definite retardation in growth with mild precocity in gonadal development. In the subsequent generations, the third to the fifth, there is accruing retardation in growth with accruing acceleration in gonadal and bodily development. Precocious "dwarfism" is the outstanding result.

The effect of pineal extract on growth is revealed in figure 1, which represents the growth curve of the successive generations, and in figure 2, which contrasts a fifth generation pineal treated rat with the normal of the same age. The "dwarfism" resulting from pineal extract (Hanson) is usually permanent, though less striking as the animals age. In rats of the second or later generations, perhaps less than 10 per cent attained normal weight or growth. The early employment of potent extract in the young almost always insures more striking and more permanent "dwarfism."

Though small, the resulting animals are precocious in development. The acceleration in differentiation is shown in the accompanying table. The lack of uniformity in size and in the rate of growth and development of individual members of a litter is striking. Because of this variability, the range of values, as well as the average, is presented in the table. The compiled data on both the growth and the development, as expressed in the table and chart, reveal the same step-like progression in succeeding generations under treatment as was evidenced in our thymus work. However, in the pineal studies there appears a peculiar paradox, a dissociation of the effects on growth and differentiation. The progressive accruing effect is in two or possibly three directions, retardation in growth accompanied by acceleration in gonadal development and also in bodily differentiation.

Owing to these changes in growth and development, the young of the pineal treated strain are quite bizarre in appearance, especially in the second and third weeks, until the body is thickly covered with fur. The configuration of the body as well as the shape of the head and face seem to depart at times considerably from normal. The short snout, broad face, round head, heavy jowl and bulging eye give a "bulldog" appearance. The small size, the large feet, the squat, compact figure suggests the "Hercules in miniature" effect, said by some to characterize the clinical picture of pineal tumor.

From the foregoing it is evident that our results in the study of many hundreds of rats do not conform entirely to most of those reported in the literature. It is true that in common with the majority of workers we have observed little or nothing of significance in the first generation under treatment. In the subsequent generations we have consistently found "dwarfism" rather than stimulation of growth. Precocity, however, has been observed in all our animals from the third generation on, and this concerns both gonadal and bodily development. The resulting animal [34] is small, often only half the normal size during the early weeks of life, precocious in development, with genitalia suggesting those seen in macrogenitosomia praecox. In addition, the animals are physically weak and appear more irritable and nervous than normal.

One other quite striking feature seems worthy of record; namely, the high incidence of eye disease in the pineal treated series of rats. Blindness is a rather frequent occurrence. This has been observed in perhaps a dozen rats in the pineal group but only twice in our thymus strain. As a rule, blindness affects one eye, but in four instances it has been bilateral. The cause is unknown. It is possible that injury plays a rôle. Bilateral cataracts were responsible in two rats. Bilateral anophthalmia was seen in another animal. Congenital hypertrophy has been seen in two instances and the so-called small eye on several occasions. Even the opening of the eye is peculiar in our pineal treated strain. When the eyelids separate, the pupil is not revealed, the eye slit as a rule being too high for the

34. Caution must be exercised as yet in interpreting these biologic effects as indicating the functions of the pineal gland. If such were the case, one should expect pinealectomy to result in enhanced growth and retarded development. Such, however, is not the case to date in a small series of rats subjected to pinealectomy in our institute by Dr. N. H. Einhorn.

pupil. Eventually, however, some form of adjustment is effected whereby the eyeball and palpebral fissure appear to harmonize.

CONCLUSIONS

Pineal extract (Hanson) has retarded the rate of growth and accelerated the rate of differentiation and has hastened the onset of adolescence in the offspring of treated parents. The end result is "dwarfism" associated with sexual precocity and relative macrogenitalismus.

The injection of succeeding generations of parent rats has resulted in the amplification of these biologic effects in their young.

Thirty-Fourth and Pine streets.

ABSTRACT OF DISCUSSION

DR. R. G. HOSKINS, Boston: If one had adopted one of the two possible interpretations of macrogenitosomia praecox as due to pineal disease, that is to say, if one had accepted the theory that it was due to the production of a hormone and not to some destructive influence, one would have predicted that an active extract of a thymus, when derived, would have the properties that this extract does have. The parallelism of prediction with what has turned out to be the properties is almost uncanny. The work raises a great many more questions than could even be asked in three minutes, and I am certain that, if the time for asking questions were sufficiently extended, enough could be asked to keep the authors busy the rest of the afternoon. Clinically there is great need for a preparation having the described properties. Every once in a while I am consulted by an anxious mother who tells me that her daughter, at 16 or 17, has achieved a height of about 6 feet and is still growing. This becomes a genuine tragedy in the life of a young girl. She doesn't fit into any social situation; her whole personality is warped by the maladjustment. I should like to ask whether anything has been done as yet toward the clinical application of the extract. Another question is whether this influence is transmitted partially through the father; if so, how do the authors believe that the influence is transmitted? I am not quite clear as to what direct effect the influence has on the individual himself and what proportion of this is obtained through the germ plasm. Does the picture shown represent only the prenatal influence, or does it represent in part a direct influence?

DR. LEONARD G. ROWNTREE, Philadelphia: So far as the clinical application is concerned, I am the only person that has ever taken any of this extract. It was a little more irritant locally than most other extracts. We are going to attempt the application of this in just such cases as you have suggested, overgrowth. I think, in both male and female, there may be a field. Now as to the part the father plays, I think I should discuss it from the standpoint of the thymus, on which we have more information than we have in relation to the pineal body, on which work is just beginning. In the thymus, if we treat the father alone, we shall see nothing abnormal. If we treat the mother and father, we see the maximal effect. If we treat the mother alone, we fall between or see nothing. I suspect, by analogy, but we must prove it, that we may see the same here. The only obvious effect that I know of, on the individual rat treated, has to do with loss of weight. Many of these animals follow the normal weight curve, but as they continue under treatment they lose considerable weight. This may have an application in overweight. That, of course, must yet be determined. We feel that these pineal rats are not as healthy as our thymus animals. Thymus animals are the healthiest rats that I have ever seen. Pineal rats are irritable and on edge. The period of gestation is twenty-two days. When we get the pineal strain nicely under way with treatment we have had in some instances litters repeatedly every twenty-three days. This suggests breeding possibilities. We are going on with this work into succeeding generations and we shall follow through with all the types of control we used with the thymus strain.

Clinical Notes, Suggestions and New Instruments

ABDOMINAL APOPLEXY

FATAL INTRAPERITONEAL HEMORRHAGE DUE TO SPONTANEOUS RUPTURE OF A VISCERAL ARTERY

M. T. MOOREHEAD, M.D., TUSCALOOSA, ALA., AND JAMES S. McLESTER, M.D., BIRMINGHAM, ALA.

Fatal nontraumatic hemorrhage into the peritoneal cavity of a male, without malignancy, is a rare vascular accident. A careful search of the literature as far back as 1912 fails to disclose the report of a single case. Several instances of massive hemorrhage into the peritoneum have been reported,[1] but most of these resulted from trauma, cancer, or disease of the female generative organs. In a few cases the bleeding point could not be located. Three nonfatal surgical cases are on record in which relief was afforded by ligation of the bleeding vessel.[2] Cecil,[3] in his textbook of medicine, discusses arteriosclerosis as a cause of hemorrhage into the peritoneal cavity but does not cite specific cases. Aaron[4] mentions arteriosclerosis as a cause of rupture into the lumen of the gastrointestinal tract but fails to mention rupture into the peritoneum.

Hemorrhages into the lumen of the stomach and intestine due to ulcer, cancer and varicosities occur frequently; mesenteric thrombosis associated with arteriosclerosis is fairly common, but actual rupture of an artery into the peritoneal cavity is a different matter. In the cases recorded here, no lesion of the gastric or enteric mucosa was present and no blood was to be found in the lumen of the gastro-intestinal tract. Each patient was confined to bed for several weeks prior to death, thus practically eliminating the possibility of trauma as a cause.

REPORT OF CASES

In the first case, hemorrhage originated at the juncture of the right and left gastric arteries on the lesser curvature of the stomach. At this point a large, densely laminated hematoma was found encasing the severely diseased gastric artery. This hematoma was so large and so dense as to resemble tumor growth at first sight. It was located partially beneath the peritoneum and was partially free, showing abundant evidence of recent bleeding. At no other point in the peritoneal cavity was there evidence of hemorrhage or disease.

The patient, a white male clerk, aged 44, was admitted to the hospital Oct. 4, 1934, because of vascular hypertension. His complaint of general weakness and difficulty in walking had had its onset in February 1934. A doctor's examination in July of that year had revealed hypertension and Bright's disease. He gave a history of having had a penile chancre in 1914, which had not been properly treated. The family history was negative or irrelevant except for the presence of Bright's disease in a sister. Physical examination revealed nothing of note except severe hypertension, the systolic blood pressure being 220, the diastolic 140 mm. of mercury. Roentgenograms revealed evidence of aortic disease with beginning cardiac enlargement. The blood Wassermann and Kahn reactions were strongly positive. The blood serum was found to contain 36 mg. of nonprotein nitrogen and 16 mg. of urea per hundred cubic centimeters. Frequent examination of the urine revealed

1. Reports of massive hemorrhage into the peritoneum:
Box, C. R., and Bamforth, Joseph: Lancet **2**: 1115 (Nov. 28) 1925.
Bruce, H. H.: Ann. Surg. **90**: 776 (Oct.) 1929.
Churchman, J. W.: Am. J. M. Sc. **142**: 825, 1911.
Hartley, Harold, and MacKechnie, D. M.: Lancet **1**: 289 (Feb. 10) 1934.
Kunz, H.: Wien. klin. Wchnschr. **38**: 222 (Feb. 19) 1925; abstr. J. A. M. A. **84**: 1161 (April 11) 1925.
Maingot, R. H.: Lancet **1**: 333 (Feb. 6) 1924.
Matthews, T. E.: Brit. M. J. **1**: 111 (Jan. 18) 1930.
Pyrah, L. N.; Stansfield, F. R., and Garland, H. G.: Brit. M. J. **1**: 810 (May 4) 1929.

2. Starcke, G.: Spontaneous Rupture of Gastroduodenal Artery, Ugesk. f. læger. **85**: 963 (Dec. 27) 1923. Budde, M.: Spontaneous Rupture of Gastro-Epiploic Artery, München. med. Wchnschr. **72**: 1383 (Aug. 14) 1925. Green, W. T., and Powers, J. H.: Intra-Abdominal Apoplexy, Ann. Surg. **93**: 1070 (May) 1931.

3. Cecil, R. L.: Textbook of Medicine, ed. 3, p. 802.

4. Aaron, C. D.: Disease of the Digestive Organs, ed. 1, Philadelphia, Lea & Febiger, 1915, p. 506.

nothing of note except traces of albumin and, at one time, a few granular casts. The specific gravity of the urine was frequently low but reached 1.020 on one occasion. The electrocardiogram showed a low T wave in all leads with a cardiac rate of 120 per minute. Other laboratory tests added no information of value. The patient was bedfast throughout his hospital stay of twenty-seven days. During the last week, paralysis of the left arm developed. His blood pressure remained high throughout. Treatment was largely symptomatic, although small doses of digitalis and one small dose of neoarsphenamine were given. He died rather suddenly Oct. 31, 1934, with signs and symptoms pointing toward internal abdominal hemorrhage.

Autopsy performed on the day of death revealed a distended abdomen, which contained roughly 4,000 cc. of free blood and fresh blood clot. The blood was present only in the peritoneal cavity. There was no evidence of trauma. The abdominal viscera were in good condition and the peritoneal surfaces showed no change except in the covering of the stomach. Here the gastric artery, which showed a marked degree of atherosclerosis, had ruptured at the juncture of the right and left branches on the midportion of the lesser curvature. A large hematoma was found encasing the artery at this point. Another hematoma was found on the greater curvature of the stomach enclosing the gastro-epiploic artery, but it was small and was located entirely beneath the peritoneal surface. The gastro-epiploic artery was found to be completely occluded in the central portion of this lesion, apparently because of atherosclerosis and ancient thrombosis. Careful examination of the gastric and intestinal mucosa failed to reveal ulceration or other evidence of disease. The muscular tunics were intact and in good condition throughout. There was no blood present within the lumen of the gastro-intestinal tract. The aorta and entire vascular system showed an advanced degree of arteriosclerosis. There were no other important pathologic changes present. The observations in this case were confirmed by careful histologic study of the vascular system and of all viscera. No important microscopic evidence of disease could be found excepting arteriosclerosis and possibly syphilis.

Another case of fatal intraperitoneal hemorrhage was seen recently in a white man, aged 50. In this instance the exact point of bleeding was difficult to locate. Rupture appeared to have taken place at the superior mesenteric artery. The arteries of the pelvis, as well as those of the splanchnic area, showed a severe degree of atherosclerosis with heavy calcification and, in some areas, complete occlusion. The patient, a salesman, was admitted to the hospital Dec. 17, 1933, for the treatment of pulmonary emphysema and myocarditis. His complaint of dyspnea and mild precordial pain was of several years' duration. He gave a history of having had pulmonary tuberculosis in 1919. He was cyanotic and dyspneic on admission and his condition remained grave throughout. Laboratory tests and other examinations were essentially negative except that an electrocardiogram showed inversion of the T waves in leads 2 and 3. The blood Wassermann and Kahn tests were entirely negative. The values for urea, sugar and nonprotein nitrogen in the blood were but slightly elevated, while repeated examination of the urine failed to show definite abnormality. There was marked polymorphonuclear leukocytosis but no other significant change in the blood picture. The roentgen observations were not remarkable. Treatment was largely symptomatic. His condition became worse and he died on the forty-sixth day with definite evidence of recent internal hemorrhage. An immediate autopsy revealed an extensive lower abdominal hemorrhage in the peritoneal cavity. Approximately 3,000 cc. of blood and recently formed blood clots were found in the abdominal cavity. The pelvis was filled with blood clot and free blood. The condition of the pelvic and splanchnic blood vessels was very bad, apparently the result of arteriosclerosis. The tunics of the superior mesenteric artery were split for a distance of several centimeters by a dissecting aneurysmal hemorrhage. This was believed to represent the original site of bleeding. There were no other important pathologic lesions present except moderate pulmonary emphysema and mild nephrosclerosis. This conclusion was supported by microscopic study of all the major viscera and of the vascular system.

CONCLUSION

Vascular disease appears to have been the underlying cause of abdominal hemorrhage and death in both of these cases. This is a rare postmortem finding; but, when the frequency of cerebral apoplexy of similar origin is considered, it is not surprising. Arteriosclerosis as a cause of death is apparently on the increase. A number of things suggest themselves as responsible for this increase. The principal factor probably is that more people live to an old age now than formerly, and therefore more people have time to develop arteriosclerosis. Other factors, such as faulty diet and a faster tempo of life, may also operate in the same direction. Coronary disease today probably outranks in frequency and in importance all other causes of cardiac disease. It is certainly the most common cause of sudden death. Cerebral apoplexy is also a common cause of moderately sudden death, but abdominal apoplexy is rare.

There are many theories as to the cause of arteriosclerosis which cannot be discussed here. One wonders whether there is justification for the theory which incriminates cholesterol, a substance found chiefly in eggs, cream and butter.

SUMMARY

Two unusual cases of fatal bleeding into the peritoneal cavity were found at autopsy to be due to spontaneous rupture of a splanchnic blood vessel. No record of a similar fatality can be found in the literature. Rupture of the gastric artery had occurred in the first case, while the site of rupture in the second appeared to have been the superior mesenteric artery. The first case was complicated by syphilis, while the second was essentially uncomplicated. The part that syphilis played in the first case is difficult to estimate, but its absence in the second is noteworthy. In both cases severe arteriosclerosis was present and probably played the most important etiologic rôle.[5]

GLYCOSURIA CAUSED BY ADMINISTRATION OF ANTUITRIN-S FOR BILATERAL UNDESCENDED TESTES

HARRY KOPLIN, M.D., LOS ANGELES

In May 1935 a mother consulted me about her son, aged 30 months, who had bilateral undescended testes. A complete physical examination showed no other abnormalities. The scrotum was empty, and the testes were not palpable.

Because of favorable results reported in the treatment of several cases of undescended testes with antuitrin-S, I proceeded to treat this child with it. Three injections of 1 cc. each were given three times a week every other day. After three weeks the scrotum began to turn pink and became swollen. In the left groin there appeared a small tumor about the size of a normal testicle. The child also complained of pain in the groin.

After about the eighth week of treatment the child began to have enuresis. He also developed a severe polydipsia. The child would wake at night, complaining of extreme thirst, gulping down a full glass of water almost in one breath.

An examination of the urine showed a large trace of sugar. The specific gravity was 1.028. No albumin was present. The child was very nervous and cross. He lost his appetite and kept asking for water all the time.

The antuitrin-S was immediately discontinued, and no other treatment was given. Daily urinalysis was done, and after three weeks from the time the last dose of antuitrin-S was given the urine became sugar free. The boy began to eat again, the enuresis stopped, and there was no polydipsia.

Both testes remain undescended. The left one can be palpated in the left groin; the right one is not palpable at all. No further treatment with antuitrin-S was deemed advisable.

4408½ South Broadway.

5. This paper was submitted to the U. S. Veterans' Administration, Washington, D. C., March 15, 1935. The autopsies were performed Feb. 1 and Nov. 1, 1934, at the Veterans' Administration Facility, Tuscaloosa, Ala. Since the paper was written, two somewhat similar reports have appeared in the literature. Willius (Proc. Staff Meet., Mayo Clin. **10**: 73 [Jan. 30] 1935) reported a fatal case of ruptured mycotic aneurysm of the splenic artery due to bacterial endocarditis. J. R. Buchbinder and E. I. Greene of Chicago (Intra-Abdominal Apoplexy, J. A. M. A. **105**: 874 [Sept. 14] 1935) reported a surgical case of ruptured gastric artery due to arteriosclerosis and cited three similar cases in the literature, in all of which recovery occurred. Our cases appear to be the first fatal arteriosclerotic cases and the first with postmortem confirmation.

Therapeutics

THE THERAPY OF THE COOK COUNTY HOSPITAL

EDITED BY BERNARD FANTUS, M.D.
CHICAGO

NOTE.—*In their elaboration, these articles are submitted to the members of the attending staff of the Cook County Hospital by the director of therapeutics, Dr. Bernard Fantus. The views expressed by various members are incorporated in the final draft for publication. The series of articles will be continued from time to time in these columns.*—ED.

THERAPY OF COUGHS

Coughing may become a part of a vicious circle, for violent coughing irritates bronchial tissue and such irritation leads to further coughing, which may continue indefinitely unless the vicious circle is checked by appropriate treatment of the cough.

Treating a cough does not mean "checking it" excepting in a small percentage of cases, for most coughs are useful.

THE USEFUL COUGH

A useful cough should be assumed to be present unless it is obvious that the cough is useless. A useful cough is one that has secretion to be brought up. It is one of the two means by which drainage from the bronchial tree is maintained, ciliary action being the other one. As the first principle in the treatment of all infections is to maintain drainage, the cough is presumably useful, whenever bronchial or pulmonary infection is present or assumed to be present.

There are three kinds of useful cough: the "tight" cough, the "loose" cough and the "insufficient" cough. All three kinds of cough may occur in the course of a single case of bronchitis, and each of them requires different treatment. Just as in war the situation may change from day to day, what was good therapeutic tactics one day may be all wrong the next. Most cases of bronchitis, as inflammations of mucous membranes in general, go through at least two stages, the stage of dryness and the stage of secretion, and it certainly is worse than foolish to keep on with measures that increase secretion when the cough has become loose.

The "Tight" Cough.—A tight cough requires, of course, to be "loosened up," and the single most important agent for this purpose is water: water from within (by ingestion) and water from without (by inhalation). When such a cough occurs in the early stages of a bronchitis, modifications of the blood supply to the skin of the chest and of the body as a whole may have well defined therapeutic potency. As in cases of such a cough the mucous membrane is likely to be very irritable, irritants of all kinds, such as menthol inhalation, must be avoided in its treatment.

Water Drinking: To emphasize, in this manner, the importance of the water as an expectorant might seem redundant were it not for the fact that this, the cheapest of all remedies, is most often omitted from prescriptions. When the patient is "dehydrated," can a cough be otherwise than dry? And yet, in the hospital, nurses will conscientiously administer, every two hours, a dose of cough medicine without water or in just a little bit of water and let the patient go thirsty in the interval. There should be at the bedside of every patient a carafe of water covered with a drinking cup, so that the patient can help himself to water whenever he needs it; and there should be an attendant—it need not be a nurse—in every ward whose chief business it is to keep the carafe of every bedfast patient filled with fresh cold water and to help those patients who cannot help themselves to take some water at frequent intervals. The sicker the patient, the less water he can or should take at one time, but the more frequently should he be given it.

Inhalation of water vapor is often incorrectly spoken of as "steam inhalation." Water vapor inhalation is probably not so much a direct way of softening tenacious mucous as it is a way of soothing the inflamed respiratory mucous membrane. It is to the irritated respiratory mucosa what the poultice is to the skin: an application of warmth and moisture. Patients suffering from acute inflammations of the larger respiratory passages—whether of the pharynx, larynx or bronchi—do best when in a warm atmosphere supersaturated with moisture. Suffocative spasms, as of croup, or asthmatoid attacks in bronchitis may thus be not only relieved but also prevented. The inhalation of water vapor may also have a prophylactic value against bronchopneumonia or prevent its extension. Hence, in all critical cases, provisions should be made to moisten the atmosphere as liberally as possible by means of a "bronchitis kettle," the "steam tent," large pans of water put on "radiators," or moist sheets hung up in the room. One should keep the relative humidity high, above 65, by whatever means available. It is obvious that keeping the atmosphere constantly moist will be more valuable than intermittent "steam" inhalation but also that the latter is better than none at all. Medication of the steam is probably of little intrinsic value. If the medicinal addition is made too strong—as of a volatile oil—it may be harmful to the acutely inflamed membrane. Having a teaspoonful of Tincture of Benzoin added to a pitcher half full of steaming water over which the patient holds his face while breathing deep may make "medicine-minded" persons carry out this treatment more conscientiously (every two hours) than if unmedicated steam inhalation is prescribed. No patient should go out into dry cold air shortly after a "steam inhalation," as this seems to make the membrane particularly sensitive. Smoking not only by the patient but also by others in the sickroom of a bronchitis patient should be strictly tabu.

"Solvent" Expectorants: There are three salts that deserve special recognition and discriminating application as expectorants in the therapy of the tight cough: ammonium chloride, sodium citrate and potassium iodide. In addition the use of ipecac, as probably the best representative of the "nauseant" expectorants, might be worthy of discussion here.

PRESCRIPTION 1.—*Ammonium Chloride Cough Syrup*

℞ Ammonium chloride ..... 10.00 Gm.
Syrup of Cherry*..... to make 120.00 cc.

M. Label: Teaspoonful in a cupful of water every two hours. (To "loosen" a "tight" cough.)

* The Syrup of Cherry recommended here will be official in N. F. VI. It is much more pleasant than the Syrup of Wild Cherry, which, made from Wild Cherry Bark, is often nothing less than nasty. The doctor who will take the trouble of comparing the two syrups will soon forget to use the word "wild" in his cherry syrup prescriptions.

All the halides of the alkali metals have a tendency to appear rapidly on the mucosae of the body, carrying fluid with them; and there is good reason to believe that ammonium chloride is the best of these for the purpose, provided it is given in liberal doses, 0.3 Gm. every hour or at least every two hours, for the effect does not last long. It must be given in a cupful of water, as ammonium chloride has a dehydrating effect when fluid is restricted. As a vehicle (prescription 1) Syrup of Cherry should be preferred to the Syrup of Wild Cherry so frequently used in cough medication.

For a child prejudiced against "medicine," it might be better to prescribe the remedy with Syrup of Acacia (prescription 2) as a vehicle and to employ the following "trick" to overcome the prejudice: Have the mother start with a teaspoonful of maple syrup in a wineglassful of water and give this "syrup water" for the first dose or two. Gradually increasing doses of the medicine are then smuggled into the syrup water and are likely to be taken with relish. Of course, syrup in excessive quantities or concentration should be avoided, as it may derange digestion and spoil appetite. The employment of a cough "linctus," a medicine so thick and sticky that it has to be licked from a spoon, is properly a thing of the past.

PRESCRIPTION 2.—*Ammonium Chloride for Child 5 Years of Age*

℞ Ammonium chloride ..... 2.00 Gm.
Syrup of Acacia..... 60.00 cc.
M. Label: Teaspoonful in water every two hours (for "tight" cough).

PRESCRIPTION 3.—*Sodium Citrate*

℞ Sodium citrate ..... 30.00 Gm.
Water ..... 30.00 cc.
Syrup of Orange .....to make 120.00 cc.
M. Label: Teaspoonful in glassful of orangeade or lemonade every two hours (in febrile bronchitis).

Sodium citrate should probably be preferred to ammonium chloride when the patient has fever, a condition that carries with it a tendency to acidosis, which ammonium chloride might possibly increase to the disadvantage of the patient. Sodium citrate, in doses of 1 or 2 Gm. (prescription 3) every hour or two, is an indirect alkali; i. e., it does not neutralize gastric secretion. It acts as an expectorant when given with plenty of water. It is also a diuretic and in sufficient dosage has a laxative effect, all of which makes it a veritable bronchitis "polychrest." Having a mild saline taste, it is easily disguised by a fruit drink, such as lemonade or orangeade. Its only disadvantages are that it may upset the stomach when given in excessive dosage or insufficiently diluted and that it sometimes causes urticaria.

Ipecac is a time honored remedy in the acute bronchial colds of infants and children. The Syrup of Ipecac may be given in doses of five drops for the first year of life, one drop being added for each year up to the adult dose. It may be combined with either one of the aforementioned salines for possible synergism (e. g., prescription 4).

PRESCRIPTION 4.—*Sodium Citrate and Ipecac for Child 3 Years of Age*

℞ Sodium citrate ..... 3.00 Gm.
Syrup of Ipecac ..... 7.00 cc.
Syrup of Orange Flowers..... 50.00 cc.
Water .....to make 60.00 cc.
M. Label: Teaspoonful in one-half cupful of water every two hours, alternating with small glassful of orangeade or lemonade (in febrile bronchitis).

Iodide is the most powerful agent available for producing hyperemia and exciting secretion of the respiratory mucous membrane, these being generally the first manifestations of the administration of iodide, called "untoward" when this effect is not wanted. In the presence of an acute inflammation of this mucosa, the irritative action causing these effects may add insult to injury. Iodide is therefore contraindicated in acute bronchitis. It is only when the acute stage of bronchitis has passed and the secretion is still tenacious and difficult to dislodge—the milder solvent expectorants having failed—that iodide is likely to be useful. It should then be given in rather small doses and at short intervals (prescription 5), which brings out most especially the effect on the respiratory mucous membrane, and with the directions to take it in a tumblerful of water every two hours until the cough becomes "loose" or the nose "starts running," and then every four hours. For a child, syrup of hydriodic acid may be prescribed, the sour taste of which blends well with a fruit syrup as a disguise (prescription 6).

PRESCRIPTION 5.—*Iodide Cough Syrup*

℞ Potassium iodide ..... 10.00 Gm.
Syrup of Orange.....to make 120.00 cc.
M. Label: One-half to one teaspoonful in a cupful of water every two hours until expectoration is free, then every four hours. (To "loosen up" an obstinate "tight" cough.)

PRESCRIPTION 6.—*Hydriodic Acid for Child 3 Years of Age*

℞ Syrup of hydriodic acid..... 15.00 cc.
Syrup of cherry.....to make 60.00 cc.
M. Label: Teaspoonful in water every four hours. (To "loosen up" the "tight" cough of subacute bronchitis in a child).

Many sufferers from a tendency to chronic cough find that they are more comfortable using iodide more or less continuously than they are without it. In such cases, it is practical—after the desired effect has been secured by more frequently administered dosage—to prescribe it in larger doses (from 0.3 to 0.6 Gm.) three times a day after meals, to be taken in a tumblerful of milk.

A warning must be sounded against the use of iodide in patients subject to tuberculosis. In many of these it tends to increase the destructive factor of the disease and favor its spread. Hence a suspicion even of the presence of tuberculosis should lead one to withhold iodide. Creosote is the remedy of choice in tuberculosis.

Maintenance of Skin Hyperemia: It is not fancy but fact that chilling of any part of the skin, more especially of the chest, causes bronchitis patients to cough more.

Absolute rest in bed is, of course, the prime essential in the therapy of all cases of febrile bronchitis; and this should include the strict use of the bedpan and urinal. Hypostatic congestion should of course be avoided in elderly people by frequent change of posture. If there is no fever, it suffices to confine the patient to a room kept, as nearly as possible, at a temperature of 70 F. As many of these patients do not feel particularly ill, they may rebel at this item of the treatment. To such it should be pointed out that the proper treatment of bronchitis may at the same time be the prophylaxis of pneumonia. The duration of such confinement should be proportionate to the duration and severity of the attack. It should exceed it by a liberal margin of days in all especially threatened individuals, including particularly patients at the extremes of life, those handicapped by systemic disease, and those prone to chronic cough. The general regimen should also include prohibition of visiting, for the less the patient talks, the less he coughs. The diet need not be restricted unless there is a good deal of fever; if there is, the diet suitable in Fever Therapy (q. v.) is ordered.

The diet of younger children needs to be modified with the fact in view that they are unable to raise sputum but swallow it. The buffer action of the mucus still further decreases the acidity of the gastric juice, which fever may have impaired to a considerable degree. Hence the milk should be skimmed and then acidified with orange juice, one ounce of which is added slowly drop by drop, and with constant stirring, to a pint of cold milk. This reduces the size of the curd, greatly increasing the digestibility of the milk.

Liniments, by maintaining hyperemia of the chest, relieve the sense of "tightness" or of substernal soreness, if they do nothing else. Greasing the child's chest with Camphor Liniment and covering it with flannel jacket or a "cotton jacket" is an established

domestic remedy, probably not without merit. One must beware, however, of burdening an infant's chest with heavy applications; e. g., a clay poultice. For adults, Chloroform Liniment may be preferred. If a flannel chest protector is too old fashioned for the modern woman suffering from acute bronchitis, one should at least insist on a flannel nightgown or a bed jacket to be worn instead of the flimsy decolleté trifle worn nowadays.

In all critical cases—and every case of febrile bronchitis in an infant or an aged person should be considered critical—it might be well to push the chest hyperemia treatment to its logical maximum, which is most conveniently attained by the mustard poultice. Mixing one part of mustard with two parts of flour (or four parts for children) and adding warm (not hot) water, one makes a moderately thin paste that is spread about one-eighth inch thick on a backing of old muslin or even of paper, large enough to cover the front of the chest from axilla to axilla, with a quarter circle cut out at the upper corners for the shoulders. A piece of cheese cloth covers the paste, which is then applied, for from five to fifteen minutes, to the chest previously anointed with petrolatum. The same poultice may then be applied to the back for a similar length of time, after which it is discarded. The strength of a reapplication, made at intervals of from six or eight hours, depends on the reaction previously secured. If it was deficient, the strength may be increased. If the skin is still flushed, the strength is progressively decreased by adding relatively more flour to the mustard as the skin becomes more sensitive. This treatment probably does good only during the stage of acute congestion. It is questionable whether it is of any service after the first two or three days of an acute bronchitis.

A plaster support of the lower costal arch is likely to be of comfort when excessively violent coughing has caused a soreness across the epigastrium or elsewhere. A Belladonna Plaster, applied while the chest is in the expiratory position, frequently suffices to give considerable relief. When, however, a cough is associated with severe stabbing pain in the chest, which is also produced by deep inspiration, as in pleurisy, it is nothing less than grievious neglect to omit the tight application of strips of Adhesive Plaster to the affected half of the chest while it is in the position of extreme expiration, in such a way as to limit greatly the respiratory excursions of the chest, which at once minimizes the pain. An elastic web (e. g., "Ace") bandage, 4 or 6 inches wide, applied snugly to the chest is often more comfortable, especially in women.

The "Loose" Cough. — As soon as the cough has "loosened up," most of the treatment previously described should be abandoned. Such a patient is now usually well on the road to recovery and may need nothing further. If, however, the loose cough is troublesome, if there seems to be too much expectoration and the cough shows a tendency to "hang on," the following items of treatment may be brought into requisition: "stimulant" expectorant, volatile oil vapor inhalation, and "reactive" chest applications: the bronchitis therapeutic triad of attack from within, from without and through the air, which may succeed when any one of these alone may fail.

"Stimulant" expectorants are aromatic bodies that owe their virtue to elimination from the bronchial mucous membrane. Given in sufficient dosage, they possibly tend to favor healing by producing a curative hyperemia. They must not be given early in a case of acute bronchitis, as they may cause recurrence of the sense of soreness in the chest and of the difficulty of expectoration.

Creosote carbonate (prescription 7) has been given in ascending dosage, though the usefulness of these preparations given orally is being questioned. As it is also antipyretic, it might be used in constant dosage of from 0.5 to 1 cc. every two to four hours, should such an effect be desired when there is also fever. It is best given suspended in a tablespoonful of hot milk, and this followed by a cupful of milk. When it is used for a long time, as in cases of tuberculosis, it is necessary to watch not only for symptoms of gastric intolerance and dizziness but also most especially for discoloration of urine or albuminuria. It is contraindicated by the presence of nephritis. From time to time its use should be intermitted, to be resumed as required; for, when used in large quantities for a long time, it may rob the body of sulfur through its conjugation in the process of elimination.

PRESCRIPTION 7.—*Creosote Carbonate*

℞ Creosote carbonate..... 30.00 cc.
Label: Five drops in tablespoonful of hot milk (followed by glassful of milk) three times daily after meals. Increase dose by one drop daily up to thirty drops three times daily (in "loose" cough).

Terpin Hydrate, given in 0.3 Gm. capsules three or six times daily, has the advantage of potability. The Elixir of Terpin Hydrate is not an eligible preparation, as it does not contain enough terpin hydrate (only 0.07 Gm. per teaspoonful) to be of much value in such cases.

Inhalations of vapor of volatile oils may, by their irritative effect on the bronchial mucous membrane, stimulate healing by increasing the rapidity of cell division and the accumulation of blood in the part, in a manner analogous to that by which tar favors the healing of subacute or chronic skin disease. The diminution and ultimate cessation of secretion expected from such treatment may be the result of an actual hastening of the healing process. If this should be the case, the strength of the irritation must be carefully gaged in accordance with the irritability of the membrane. Certain it is that, employed too soon, too strong or too long, such inhalation may make matters worse. Creosote might be chosen as a typical representative of aromatic inhalants, though Eucalyptol or Terebene might be thought of as succedanea.

The inhalation of the agent by direct heating, as when one pours a teaspoonful of Creosote in an earthenware dish placed over a source of heat, releases a vapor so irritative that the eyes must be protected by watch-glass goggles applied with adhesive plaster, and the nostrils stopped with cotton. Inhalation of such vapor causes violent coughing, which may help in the emptying of the bronchial cavities; and, if such inhalation should be continued after the emptying of the cavity, it may exert on its lining an effect that might stimulate healing as well as possibly diminish the foulness of the secretion for some time afterward. In such cases, if the patient can tolerate it, the inhalation might be continued for from one-fourth to one-half hour.

The inhalation is milder if one places a teaspoonful to a tablespoonful of the volatile agent in a half pitcherful of hot water. The most convenient and at the same time the mildest method of using these agents is to drop the volatile material on an inhalation mask, such as a choloroform inhaler. For initial strength, one might dilute the Creosote with Alcohol and possibly add Chloroform, which makes the inhalation more

pleasant (prescription 8). It might be kept up for hours or be intermitted from time to time, as the effects and the patient's tolerance dictate. Continuous inhalation, day and night, no doubt gives the maximum effect.

"Reactive" chest applications may be useful. The chest compress, with its power to excite deep respirations and to produce an ebb and flow of blood not only on the skin but probably also in the bronchial mucosa,

PRESCRIPTION 8.—*Creosote-Chloroform Inhalant*

℞ Creosote
Chloroform
Alcohol.....of each 20.00 cc.
M. Label: From fifteen to thirty drops on inhaler (in "loose" cough).

is a measure that should be resorted to more frequently in cases of subacute and chronic bronchitis. In a bed patient it may be applied every two or three hours. The ambulatory patient applies it at bedtime, to leave it on over night. On removing it in the morning, he dashes cold water on the chest and follows this with a brisk rubbing.

One requires for this compress a strip of one or more folds of linen about 10 inches wide and 3 yards long, and a strip of flannel of the same length and about 1 inch wider. The rolled up linen bandage is well wrung out of water at 60 F. This compress is also known as the "cross binder," because it forms a cross on the front and the back of the chest, being applied in a diagonal manner from axilla to shoulder. Starting in one axilla, one brings it over the opposite shoulder and then back to the starting point. Next it is drawn transversely across the chest under the opposite axilla and across the back over the shoulder of the side one had started on. The end is then tucked in, in front, under the transverse course of the bandage. The flannel is applied in the same manner and quite snugly. Usually three safety pins—one in the midline at the neck and one at each shoulder—suffice to complete good covering, so as to keep "the air from getting at the wet." When the compress is well applied and the patient reacts to it properly, he should, within a few minutes, feel warm and comfortable in it.

The "Insufficient" Cough.—The "insufficient" cough is a condition in which the amount of bronchial secretion exceeds the coughing powers so that slime accumulates in the chest. Exhaustion produces this condition; so may the unwise administration of narcotics. Carbon dioxide narcosis may become superadded, with an inevitably fatal outcome unless the insufficiency of the cough is antagonized by heroic means.

When the presence of numerous moist râles all over the chest and other evidence, such as cyanosis, point to the danger of the patient drowning in his own secretions or to the likelihood of the development of bronchopneumonia following obstruction of bronchioles, all liquefying expectorants are contraindicated and checking the cough by opiates or other sedatives is disastrous. It is necessary in such conditions to increase the act of coughing so as to favor clearing the chest by expectoration. This may be done by the following means:

1. Irritation of the pharynx. (*a*) Benzoic acid, from 0.10 to 0.20 Gm. in powder (prescription 9) or as a

PRESCRIPTION 9.—*Benzoic Acid Powder*

℞ Benzoic acid ..... 1.50 Gm.
Oil sugar of lemon ..... 10.00 Gm.
M. and divide into fifteen powder papers. Label: One every two hours (for insufficient cough).

lozenge, given at two hour intervals, produces a "scratchy" feeling in the throat that results in coughing.

(*b*) Senega and other saponin containing drugs have a similar action. This may make the Fluidextract of Senega (prescription 10) a good addition to the benzoic

PRESCRIPTION 10.—*Benzoic Acid and Senega*

℞ Benzoic acid ..... 1.50 Gm.
Fluidextract of Senega..... 15.00 cc.
Iso-alcoholic elixir.....to make 60.00 cc.
M. Label: Teaspoonful in water every two hours (for insufficient cough).

acid prescription for adults, and the Syrup of Senega the preferred vehicle of sodium benzoate for children (prescription 11).

PRESCRIPTION 11.—*Sodium Benzoate and Senega, for Child 5 Years of Age*

℞ Sodium benzoate ..... 0.50 Gm.
Syrup of Senega.....to make 60.00 cc.
M. Label: Teaspoonful in a little water every two hours (for insufficient cough).

(*c*) Ammonium Carbonate should most especially be thought of as an agent that may favor expectoration by irritation of the throat, while also acting as a circulation and respiration stimulant, effects particularly required in the treatment of bronchitis and bronchopneumonia of babies and young children. It is probably best prescribed in Syrup of Acacia (prescription 12).

PRESCRIPTION 12.—*Ammonium Carbonate for Child 3 or 4 Years of Age*

℞ Ammonium carbonate ..... 2.00 Gm.
Anise water ..... 10.00 cc.
Syrup of Acacia.....to make 60.00 cc.
M. Label: Teaspoonful in water every two hours (for insufficient cough and collapse).

2. Increasing the depth of respiration. (*a*) Patients with insufficient cough must be urged to breathe deeply and to cough and expectorate as much as possible. When a patient with greatly insufficient cough, who is in danger of drowning in his own secretions, begs for someting to stop the cough and to help him to sleep, this request must be denied, for the good sleep that he craves may be his final sleep. Such a patient should be told that he must cough to live, that his chief business is to cough, and to sleep by taking snatches of sleep in between coughing spells.

(*b*) Inhalation of oxygen with 5 per cent carbon dioxide may act as the powerful stimulus to the respiratory center required to provoke respirations sufficiently deep to get beyond the accumulating secretion.

(*c*) When psychotherapy is unavailing, because of the patient's inability to cooperate and when carbon dioxide-oxygen is not available, a dash of cold water applied to the chest or even merely to the nape of the neck is a most powerful stimulus to deep respirations. The result is best secured by alternate hot and cold affusions to the chest. One starts with a pouring of hot water (110 F.) until the skin reddens, and follows this immediately with a sudden dash of cold water (60 F.) and brisk rubbing. These alternations should be continued until the desired effect is obtained. One must be careful to avoid exhausting a much enfeebled patient. In a child or an infant, immersion of the body in a hot mustard bath may be employed instead of the hot affusions.

3. Diminution of secretion. This may be attempted by: (*a*) Atropine sulfate, 1 mg. hypodermically, most especially when collapse, with pale and moist skin, also indicates it. The dose may be repeated in one-half hour if no marked effect is obtained; after this it may be continued at intervals of two hours, the patient being kept on the verge of atropinism.

(*b*) Restriction of intake of fluid should be resorted to only as a measure of desperation and if circulatory

insufficiency likewise demands it; for, in general, natural reactions should be given credit for probably being beneficial. They should be restrained by extreme measures only when they actually threaten life.

(*c*) Hypertonic dextrose phleboclysis (from 10 to 25 cc. of 25 per cent dextrose solution) and (*d*) blood letting to the extent of 500 cc. of blood—measures useful in pulmonary edema—may possibly help to carry a patient through a critical stage.

4. Evacuation of the fluid by: (*a*) Postures. The head-low posture may favor expectoration of very fluid exudate. So does the performance of the movements of artificial respiration, with continuous or intermittent aspiration of the fluid accumulating in the throat. Such maneuvers may be life saving in illuminating gas poisoning.

The actual head-down posture may be of great advantage in lung abscess and in certain bronchiectatic cavities. Such coughs are characterized by being brought on by change of posture. The treatment is carried out by first placing the patient for five or ten minutes on the healthy side to permit drainage of purulent material into the larger bronchi or, if the abscess is in the upper lobe, the patient should sit erect for ten minutes before lying on the healthy side. Then the patient's trunk should be inverted by having him lie crosswise on the bed with the groins at the edge of the bed, so that the body is bent at the hips and the head is at or near the floor, with the body vertical; an attendant should hold the thighs as they lie across the bed. The position is to be maintained for five or ten minutes, the patient breathing deeply. A pus basin had better be placed on the floor near the mouth for collection of the profuse expectoration. This position or any other position that favors expectoration might be assumed four times a day, a half hour before each meal (because of possible emesis) and at bedtimes, and even more frequently. Thus the patient may be spared much coughing in the intervals. As such posture treatment is quite an exertion, it is of course not to be resorted to if the patient is extremely feeble.

Bronchoscopy is indicated if drainage is obstructed by objects removable by this means.

(*b*) Emesis. In infants and small children, induction of emesis may succeed in producing the powerful compressions of the chest that are required for the evacuation of retained secretion. Also, as the infant swallows the sputum, the evacuation of the stomach may be considered a form of "secondary expectoration." One gives for this purpose one teaspoonful of Syrup of Ipecac every fifteen minutes for several doses until the desired result is secured. For small infants half teaspoonful doses of Syrup of Ipecac may suffice.

THE USELESS COUGH

One should be very loath to condemn a cough as useless. But there are coughs that are not only useless but even harmful, as the cough of aortic aneurysm, the cough provoked by a tuberculous mediastinal lymph gland, or the after-cough of an acute bronchitis. A useless cough is one that not only fails to bring up secretion but has no secretion to bring up. This gives the indication for antitussic therapy, i. e., the actual antagonizing of the cough reflex, which can be achieved by three different modes of attack, which may be employed separately or combined into one grand assault. These are (1) psychotherapy, (2) local sedation and (3) depression of the medulla. Antitussic therapy should always be thought of in this order, because the first is the least likely to be harmful and is the one to be employed most generally, and the last is the most liable to be harmful and should be avoided if possible.

1. *Psychotherapy.*—The patient should be urged to suppress the cough as much as possible. This is a good rule to lay down for all coughs excepting, of course, the insufficient cough; for patients usually strain a good deal harder in coughing than is necessary or good for them. When there is expectoration to be raised, mucus that does not come up readily with one coughing spell will probably come up easily with the next. When there is no slime to expectorate, the patient's attention should be called to the utter uselessness of the cough, and its harmfulness should be explained to him. He should know that coughing begets coughing. If the patient remonstrates that he cannot stop coughing because of the irritation that forces him to do so, it may be admitted to be difficult, but it should also be pointed out that he may, at times at least, suppress the desire to cough and that each time he does so he makes it easier to suppress the desire another time.

Coughing is decidedly harmful and even dangerous whenever there is a "weak spot" in the lungs. The increased intrapulmonary pressure gotten up in coughing prior to the sudden opening of the glottis will stretch most the least elastic portion of the lungs. It is this that makes pulmonary emphysema progressively worse and that renders impossible the healing of cavities, be they bronchiectatic or tuberculous. It is this stretching of the weakest spot in the lungs that is the greatest possible hindrance to the checking of hemoptysis and, by the possible causing of tears, a constant invitation to its recurrence. Such patients should not only be taught to suppress coughing as much as possible but, when cough they must, to do so with the glottis open, which reduces the cough to a forcible exhalation.

2. *Local Sedation of the Pharynx.*—This is likely to be especially indicated in coughs made worse by lying down. In children "marshmallows," honey and milk, or flaxseed lemonade are useful. Demulcent lozenges, such as Slippery Elm Troches, licorice gum drops, or other so-called cough drops, or even a lump of sugar, when slipped into the mouth the moment the warning tickle is felt in the throat, may help in suppressing the cough. Ethylaminobenzoate (anesthesin) lozenges are likely to be still more efficient for the purpose, as their use leaves a numbness in the throat.

3. *Depression of the Medulla.*—(*a*) Bromide is especially valuable when coughing is maintained chiefly by excessive nervous irritability. It may be resorted to in any cough that seems excessive, as it does not really check coughing. Syrup of Glycyrrhiza is a good vehicle for bromide (prescription 13). In this prescription the dose of bromide is so small that when real

PRESCRIPTION 13.—*Bromide Cough Syrup*

℞	Sodium bromide	10.00 Gm.
	Anise water	10.00 cc.
	Syrup of Glycyrrhiza to make	120.00 cc.

M. Label: Teaspoonful in water every two to four hours (for excessive cough).

sedation is required it might have to be multiplied by 2, 4 or even 8. Other vehicle syrup may be used: e. g., the Syrup of Thyme, to which may be added 0.12 Gm. of potassium or sodium bromide per teaspoonful. There is no special virtue in the Syrup of Thyme. It merely offers an unusual and not unpleasant flavor, as does also, for instance, the Compound Syrup of Asarum. Variety in vehicles enables the physician to

administer the same medicines for different purposes, which indeed might be very desirable in a neurotic individual who may need bromide for a variety of excessive nervous reaction. By prescribing the medicine in different vehicles for the different purposes, the patient may be given the benefit of bromide, without arousing in the patient the resentful thought that, no matter what he complains of, the doctor always gives him the same medicine.

PRESCRIPTION 14.—*Codeine Cough Syrup* *

℞ Codeine phosphate ..... 0.50 Gm.
Aromatic Syrup of Eriodictyon.....to make 60.00 cc.

M. Label: Teaspoonful in a little water every two to four hours as required (for useless cough).

* Such prescription requires, under the Harrison Act: the stating of (1) patient's name; (2) his address; (3) the condition for which the prescription is written; (4) physician's name; (5) his address, and (6) his registration number. And it must be written in ink.

(*b*) Opiates in sufficient dosage check coughing as if by magic. For this purpose codeine is best, the phosphate its most soluble salt, and the Aromatic Syrup of Eriodictyon (prescription 14) its most efficient disguising vehicle. When it is really wished to check cough, the codeine should be given in doses of from 0.03 to 0.06 Gm. every two to four hours as required.

CHRONIC COUGH

While, no matter what kind of a cough is being treated, discovery of its cause is desirable, a correct and complete diagnosis becomes the paramount necessity in the treatment of a chronic cough. The great *vis medicatrix naturae* (the healing power of nature) gives assurance of a natural tendency for coughs to cease. When this tendency does not assert itself, one must discover what it is that keeps it from doing so. In the last analysis, this will always be found to be due to either "irritation plus," "nutrition minus," or a combination of the two.

"Irritation plus" lies most commonly at the bottom of a chronic nonproductive (useless) cough; and this "plus" of irritation may be the result of (*a*) excessive irritability, (*b*) extrabronchial irritation or (*c*) inhalation of irritants. It is in the last mentioned kind that the cough may also be of the "useful" variety.

(*a*) Nervous irritability results in the "nervous cough," which may become a lifelong habit, indulged in most especially when the individual is embarrassed, as by a pause in conversation, or when he is reminded of the cough, as by being asked whether the cough troubles him a good deal. It is apt to cease suddenly when the mind is distracted and to disappear at night. It is nearly always accompanied by other phenomena of nervousness and may be displaced by other manifestations of neurosis. In spite of its chronicity, it has but slight effect on general nutrition and there are no physical changes. Such a cough should be cured by psychotherapy in one or all of its modalities, as they may be required: suggestion, reeducation, mental hygiene, psychoanalysis. Regarding the symptom itself it is best to employ the "policy of neglect." By this is meant paying no attention whatever to the symptoms while giving most solicitous care to the patient as a whole. Such a policy acts as a powerful suggestion that the symptom is not really of any importance, just as direct treatment of the symptom may serve to maintain it by fixing the patient's attention on the cough.

It will not do, however, to dismiss a cough lightly as being merely of nervous nature, because the cough of early tuberculosis may masquerade thus, until when this cough throws off its mask it may be too late for the cure that might have been easy at first. Hence the fundamental principle in all chronic coughs must be "suspect tuberculosis" (q. v.), as this is the single most common cause of a chronic cough. While it is a grievous error to pronounce this suspicion until one is convinced of its correctness by positive evidence, one must not rest content until the patient either stops coughing or until it is known definitely why he cannot and one is ready to apply the correct remedy that will cure or at least relieve him.

(*b*) Extrabronchial reflex irritation is often spoken of as the "reflex cough"; a faulty designation, for all coughing is reflex. Even though, from a theoretical standpoint at least, the possibility of a "stomach cough," a "uterine cough," a "nasal cough" or an "aural cough" must be admitted, these are so rare in practice that it is just as well to forget about them. On the other hand, one should remember the fact that the pharynx is the most important tussogenic zone next to the tracheal bifurcation and the bronchi, that chronic tonsillitis is perhaps the fourth most common cause of a chronic cough, and that mouth breathing—no matter what its cause—maintains bronchial irritation by insufficient warming and moistening of the inspired air. Next to attention to the chest, all chronic coughs demand attention paid to the throat, irritation of which might also be maintained by discharges from the paranasal sinuses.

In infants and children, extrabronchial coughs are very common. The usual history of a cough starting when the child is in a recumbent position is almost always elicited. The cause may be reflex from the irritating secretions in the nasopharynx, especially chronic infection in the adenoid tissue. In children, a useless or at least excessive cough that hangs on and resists ordinary remedies may be due to pertussis (q. v.) or to mediastinal irritation. Enlarged mediastinal lymph glands may maintain a cough that can often be cured by appropriate x-ray treatment. This may also cure the dangerous cough of thymus enlargement, the presence of which should be suggested by the triad of cough, dyspnea and stridor occurring in an infant. The rule should be formulated that every case of chronic cough requires a roentgenographic examination of the chest. This enables one to diagnose and, in consequence, cure not only the conditions just mentioned but also early tuberculosis; and it also gives the correct indication for treatment of the "brassy" pressure cough of aortic aneurysm or of a tumor (possibly carcinoma) pressing on the trachea or bronchi. In the "pressure cough" the patient is entitled to all the antitussic in the form of opiate that he needs to keep him as comfortable as possible under the circumstances.

(*c*) Inhalation of irritants may result in a productive (useful) cough that will not cease until the source of the irritation is discovered and removed. This is not infrequently the excessive use of tobacco. Hence in all chronic coughs the use of tobacco should always be interdicted or at least greatly restricted. Occupational exposure to irritative dust or vapors, as in mining, polishing, stone cutting, cement mixing or milling, may be the cause of a chronic cough, which may demand change of occupation, if proper ventilating devices to protect the worker are not sufficient or available. The rule of employing roentgen examinations in all chronic coughs should enable one to detect pneumoconiosis and to insist on change of occupation before the disease has progressed to the crippling stage.

"Nutrition minus" is the most common cause of the chronic useful cough. In such cases, inhalation of

irritants having been excluded, one must look for a nutritional disturbance that prevents the healing of the inflammation responsible for the secretion. This nutritional disturbance may be found in one of three great groups (*a*) impaired blood supply, (*b*) a dyscrasia or (*c*) local tissue change; and it may be a combination of factors from two or all three of these groups that may account for the chronicity and require correct evaluation of their relative importance for successful therapy.

(*a*) Impaired blood supply. Heart disease is one of the three most common etiologic factors in maintaining a chronic cough. When this combination is present, the two must be dealt with simultaneously, as the combination may result in a vicious circle. The cough itself should be treated in accordance with the principles previously laid down, and the heart disease as discussed under Therapy of Congestive Heart Failure (q. v.).

Anemia, when present, deserves radical treatment, as laid down under this heading (q. v.), for, without a generous supply of good red blood, healing is always languid.

(*b*) Dyscrasias. When a nephritic or a diabetic patient develops a bronchitis, treatment of the cough must be combined with the correct treatment of the systemic condition to secure satisfactory results.

The presence of an allergy must be most especially suspected when a spasmodic factor is present: the combination of bronchitis and asthma (q. v.).

In the absence of well defined metabolic disease, the ill defined condition called "poor resistance" may be responsible for the maintenance of a chronic cough. Such impaired resistance should be met by one or more of the following remedies:

1. Cod liver oil. It is probably because the impairment of resistance is in many cases an avitaminosis, most especially in children, and because of the frequency with which rickets (q. v.) is the cause of chronicity of bronchitis, that cod liver oil has acquired a great reputation in the treatment of chronic coughs. There is no doubt that cod liver oil may be an excellent medicine for a child or an adult whose nutrition is poor and who is subject to a winter cough; for cod liver oil is also a fattening food, which makes it superior in those below par in weight to the more concentrated vitamin (A and D) preparations. Cod liver oil should be administered to children in teaspoonful doses and to adults in doses of tablespoonfuls, though it may be well for either to commence with a smaller dosage and gradually work up to the desirable quantity. It is best given two hours after meals. It may be floated in orange juice (which may decrease the vitamin C effect) or it may be administered as the Aromatic Cod Liver Oil of the Recipe Book (prescription 15), if the patient objects to the flavor of the oil. Cod Liver Oil Emulsion, containing only 50 per cent of oil, may meet the indication when the patient refuses to take the oil itself in any form because of its "oiliness." It would, of course, be a mistake to employ Cod Liver Oil in a case of malnutrition to the extent of interfering with the ingestion or digestion of other food. Indeed, anorexia and fever are the two most important contraindications to Cod Liver Oil. When it produces diarrhea it must also, of course, be stopped. "Not to employ any medicine that upsets digestion or impairs the appetite" should indeed be a fundamental principle in the treatment of all chronic coughs, as the cure may depend more on improvement of nutrition than on any good the medicine may do.

PRESCRIPTION 15.—*Aromatic Cod Liver Oil*

℞	Saccharin	0.10 Gm.
	Compound Spirit of Orange	5.00 cc.
	Cod liver oil	250.00 cc.

M. and filter. Label: Tablespoonful three times daily two hours after meals (in chronic bronchitis with malnutrition).

It should also go without saying, were this principle not so frequently neglected, that it takes proper diet, not medicine, to "build up" a patient, and that, before Cod Liver Oil is even started, one should be sure that the nutritive value of the patient's diet has been increased to the limit of his digestive capacity.

2. Arsenic. One may think of arsenic as a possibly useful alterative when other medicine does not seem indicated or is not well borne in the case of a chronic cough. It may display the same kind of healing tendency in chronic bronchitis that it does in some chronic skin diseases, e. g., psoriasis. Properly given, it may improve appetite, digestion and bowel evacuation, favor gain in weight and lessen anemia, and make expectoration easier, possibly in a manner similar to that by which iodide acts, catarrh of the respiratory mucosa being one of the earliest untoward symptoms of arsenic action. Indeed, in a case of chronic bronchitis in which iodide is not well borne one should always think of arsenic as a possibly useful succedaneum. When anemia is present, the arsenic may well be combined with iron (prescription 16).

PRESCRIPTION 16.—*Arsenic and Iron*

℞	Arsenic trioxide	0.03 Gm.
	Reduced iron	2.00 Gm.

M. and div. into thirty pills. Label: One to two pills three times a day after meals (in chronic bronchitis with anemia).

3. Proteotherapy. "Poor resistance" may not only be due to obvious malnutrition but also be present in the less obvious form of deficiency in immunization reactions on the part of the patient's system. Focal infection (q. v.) may be responsible for this and should therefore be searched for and properly treated. Attempts at raising antibacterial resistance by some form of proteotherapy are also in order. Which one of the many possible varieties is best cannot as yet be stated with certainty. One may prefer, as probably its most rational form, the properly graded administration of autogenous vaccine.

4. Ultraviolet rays, be they applied in the form of sun's rays (heliotherapy) or of the rays from a carbon arc or a mercury vapor lamp, have a stimulating effect on metabolism and resistance to infection, provided the optimal dosage is not exceeded and provided the patient is free from fever or a tendency to fever. It is always best to start with a dose that will certainly be safe and to increase it very cautiously until the skin is tanned, when tolerance may be considered to have been established and much larger exposures may be safely borne; but these must always be well within the limit of producing depression or exhaustion. Pigmentation of the skin is essential to success and usually coincides with clinical improvement.

5. Hardening. The "poor resistance" may also be due to insufficient systemic reaction on exposure to chilling influences. Such patients are liable to "take cold" frequently, have difficulty in getting over colds, and ultimately develop a cough that hangs on all winter but disappears during the summer. This might be one of the differentiating features in leading one to suspect more or less strongly the presence or absence of early tuberculosis, for in the latter condition the cough is less likely to be quite as seasonal but to continue throughout the year, though it may be less troublesome during the summer. Such individuals should be taught the hygiene of clothing. They must by degrees be inured to out-

door life. They can be greatly helped in this by a graded course of "tonic" hydrotherapy, a form of water treatment in which a "good reaction" is the sine qua non to success.

Hardening treatment is contraindicated in individuals at the extremes of life, in those enfeebled by any severe systemic disease, such as nephritis, and in rheumatic, neuritic or neuralgic conditions. During menstruation and in the presence of acute catarrh, no matter of which mucous membrane, hardening procedures should be temporarily abandoned.

6. Climatotherapy. Change of climate should be insisted on for all those suffering from a winter cough who cannot be subjected to "hardening" or who will not undertake it. Certainly nothing is more rational in therapy than to rescue those who are well during the summer and ill during the winter from the tax that winter puts on their system, most especially as in the cases of "chronic bronchitis" the results of the inclemencies of weather tend to become progressively worse, eventuating in ultimate pulmonary and systemic crippling, premature old age, and a welcomed early death. Such individuals should spend the winter in a warm, sunny climate. For those with profuse expectoration, dry climates are more suitable; while, for those with little expectoration and excessive cough, a moderately moist climate is to be preferred. During the summer, forest areas in moderate elevation as free as possible of wind and dust are best.

To the poor, who cannot afford to travel, the artificial tropical climate of indoor confinement may be the means of minimizing suffering and of prolonging life. Under such circumstances special attention should be paid to uniformity of temperature (from 68 to 70 F.) and a sufficient degree of relative humidity (from 40 to 60 per cent).

Much night coughing may be spared a sufferer from chronic bronchitis if his bed is warmed before he enters it and if he is given, at bedtime, a hot drink, such as a glass of hot lemonade. Another glass of hot lemonade first thing in the morning will lessen the difficulty these patients experience in clearing their chest of mucus that has accumulated during the night.

Absolute rest in bed even for weeks or longer may be the sovereign remedy for a cough that hangs on, especially if it is accompanied by a considerable degree of malnutrition and particularly if a slight elevation of temperature exists. In this manner a case of incipient tuberculosis may be cured before it is diagnosable.

(*c*) Local tissue change. This condition must be prevented by all means at hand. Unfortunately, this is impossible in case of pulmonary carcinoma, which should be suspected in an elderly person, especially a man, who develops, in addition to cough, pain in the chest, wheezing, possibly hemoptysis, and who loses weight rapidly. The suspicion should lead one to look carefully for metastases, which develop early in these cases, to examine the chest for even minimal x-ray changes, and to employ bronchoscopy. The early diagnosis may avoid useless treatment by and discredit of the therapist. The employment of adequate roentgen therapy will diminish the suffering, which should also be assuaged as completely as possible by the use of an antitussic even to the point of the narcotic habit.

Pulmonary emphysema and bronchiectasis are the most common causes, next to tuberculosis and heart disease, for the maintenance of a chronic cough. Dilatation of the bronchi and of the alveoli of the lungs are, indeed, invariable results of any chronic severe cough, no matter what its origin; and, once these conditions have become established, they maintain the cough even after the original cause has disappeared.

Bronchiectasis (q. v.), a common cause of what has in the past been called "chronic bronchitis," is now not only definitely diagnosable, thanks to opaque medium roentgenography, but also relatively amenable to treatment by postural drainage, injection treatment of the cavities, bronchoscopy, and pulmonary collapse therapy.

As pulmonary emphysema leads to congestive heart failure, which in turn maintains cough, there exists here a veritable chain of vicious circles. Remembering the essential incurability of these changes, once they are grossly developed, one should resolutely employ all the various means at command to break in on these vicious circles at some one or all points, aiming to establish for the handicapped individual some level of tolerable existence, which the skilful physician may often maintain in a cooperative patient for many years.

From all that has been said, it must be obvious that no greater sin can be committed in therapy than pronouncing a cough a case of "chronic bronchitis," assuming a hopeless and helpless attitude, and letting it go at that.

Council on Pharmacy and Chemistry

REPORTS OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT.

PAUL NICHOLAS LEECH, Secretary.

THE POTENCY OF AMPOULES OF PITRESSIN

In New and Nonofficial Remedies 1935, the "pressor" potency of Ampoules of Pitressin (P. D. & Co.) is defined as follows: ". . . each cubic centimeter contains 20 pressor units. . ." Too late for revision of this description, Parke, Davis & Co. informed the Council that the standardization of its product had been changed so that each cubic centimeter was to contain but 10 pressor units. In order that the requisite revision of the description for New and Nonofficial Remedies 1936 might be made, the firm was recently asked whether or not this change was still in effect. The firm replied to the effect that experience indicated that the 10 pressor unit product was not adequate in all cases. It further informed the Council that it had decided to restore Ampoules of Pitressin to the original potency of 20 units per cubic centimeter and that therefore revision of the N. N. R. description would not be needed. In order that the medical profession might be informed, the Council has authorized publication of the foregoing statement.

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

IODOBISMITOL WITH SALIGENIN.—A solution of sodium iodobismuthite (sodium bismuth iodide) and sodium iodide in propylene glycol (racemic 1,2 propylene glycol) containing saligenin and a small amount of acetic acid.

Actions and Uses.—Iodobismitol with saligenin seems to be well absorbed and to be excreted fairly rapidly. In laboratory animals the bismuth enters the brain in from 90 to 100 per cent of the cases. The claim is made for it that it will penetrate the brain in significant quantity in a great majority of persons treated. This claim, however, needs further confirmation, and therapeutic indications based on it must be considered unwise.

Dosage.—Intramuscular injections of 2 cc. repeated every three days. Two full days should elapse between injections.

From eight to twelve injections comprise a course of treatment. A rest period of from two to four weeks should elapse between courses. At each injection the patient would thus receive from 0.024 to 0.0276 Gm. of metallic bismuth (from 0.1154 to 0.1328 Gm. sodium bismuth iodide, and from 0.218 to 0.258 Gm. sodium iodide).

Manufactured by E. R. Squibb & Sons, New York, by license of Stanford University. U. S. patent 1,890,508 (Dec. 13, 1932; expires 1949) and 1,927,210 (Sept. 19, 1933; expires 1950). U. S. trademark.

Ampules Iodobismitol with Saligenin 2 cc.: Each 2 cc. contain from 0.1154 to 0.1328 Gm. of sodium iodobismuthite (equivalent to 0.024 to 0.0276 Gm. of bismuth) and from 0.218 to 0.258 Gm. of sodium iodide, dissolved in propylene glycol containing 4 per cent saligenin and 0.1 per cent acetic acid. The total iodide per 2 cc. is equivalent to from 0.252 to 0.296 Gm. of sodium iodide.

The specific gravity of iodobismitol with saligenin at 25 C. ranges from 1.167 to 1.175. The *pH* of iodobismitol with saligenin taken with a quinhydrone electrode ranges from 4.5 to 5.0. The refractive index at 25 C. ranges from 1.4609 to 1.4611.

Transfer about 3 cc. of iodobismitol with saligenin, accurately weighed, to an erlenmeyer flask, add 3 cc. of hydrochloric acid and 125 cc. of water; determine the bismuth according to the method outlined in New and Nonofficial Remedies under sodium iodobismuthite: each cubic centimeter contains the equivalent of not less than 0.012 nor more than 0.0138 Gm. of bismuth. Add 10 cc. of a nitric acid-silver nitrate solution (prepared by dissolving 1 Gm. of silver nitrate in 20 cc. of water and adding 5 cc. of nitric acid) to about 3 cc. of iodobismitol with saligenin, accurately weighed, and then add 100 cc. of water, allow to stand two hours, filter into a prepared gooch crucible, and wash with very dilute nitric acid (5 cc. of diluted nitric acid to make 100 cc.), dry to constant weight at 100 C.: weight of silver iodide is equivalent to not less than 0.135 nor more than 0.145 Gm. of iodide per cubic centimeter.

The sodium iodobismuthite in iodobismitol with saligenin conforms to the New and Nonofficial Remedies standards for this substance.

The propylene glycol used in the preparation of iodobismitol with saligenin complies with the following tests and standards:

Propylene glycol, racemic 1,2 propylene glycol, $CH_2OH\ CHOH\ CH_3$, occurs as a viscous, colorless, almost odorless liquid, completely miscible with water, alcohol, chloroform and ether. The specific gravity at 25 C. ranges between 1.035 and 1.037. The refractive index at 25 C. ranges between 1.4312 and 1.4317.

Transfer 25 cc. of propylene glycol to a distilling flask; determine the distillation range according to Method I of U. S. Pharmacopeia X: ninety-five per cent distils over at from 184 to 189 C. (corrected) at 760 mm. The refractive index of the distillate is the same as that of the material before distillation. Agitate 5 cc. of propylene glycol with 15 cc. of distilled water; insert a piece of red and a piece of blue litmus paper: the solution must be neutral to the litmus papers. Add 1 cc. of silver nitrate solution and 1 cc. of nitric acid to 5 cc. of propylene glycol diluted with 15 cc. of water: not more than a slight opalescence appears within fifteen minutes *(chloride)*. Add 1 cc. of barium chloride and 1 cc. of diluted hydrochloric acid to 5 cc. of propylene glycol diluted with 15 cc. of water: no precipitate forms in fifteen minutes *(sulfate)*. Bubble hydrogen sulfide through 5 cc. of propylene glycol diluted with 15 cc. of water: there is no opalescence and no change of color.

Incinerate about 2 Gm. of propylene glycol, accurately weighed, in a platinum dish: the residue is not more than 0.05 per cent.

The saligenin used in the preparation of iodobismitol with saligenin complies with the following tests and standards:

Saligenin, ortho-hydroxy benzyl alcohol, salicyl alcohol, occurs as white monoclinic plates. It is soluble in water, chloroform, and the fixed and volatile oils; freely soluble in alcohol and ether. The aqueous solution is neutral to litmus paper. It melts between 86 and 87 C.

Mix equal weights of saligenin and aniline, boil for five minutes, cool, recrystallize once from alcohol: the melting point falls between 97 and 103 C. (ortho-hydroxy benzyl aniline: melting point of pure substance, 108 C.). Saligenin is not precipitated by the usual alkaloidal reagents. Add a few drops of ferric chloride solution to about 0.1 Gm. of saligenin: the solution becomes bluish violet. Add a few drops of sulfuric acid to about 0.01 Gm. of saligenin: the particles instantly become cherry red, while the acid is but slightly colored *(distinction from other local anesthetics)*. Add 100 cc. of cold water to 0.3 Gm. of saligenin in a beaker: the substance is completely soluble and the solution is colorless *(substances insoluble in cold water)*. Add 1 cc. of sodium hydroxide solution to 5 cc. of a saturated solution of saligenin: there is no tinge of yellow *(absence of salicyl aldehyde)*. Add 1 cc. of silver nitrate solution and 1 cc. of diluted nitric acid to 5 cc. of a saturated solution of saligenin: not more than a slight opalescence appears *(limit of chloride)*. Add 1 cc. of barium chloride solution and 1 cc. of diluted hydrochloric acid to 5 cc. of a saturated solution of saligenin: no precipitate appears *(absence of sulfate)*. Dissolve about 0.40 Gm. of saligenin (weighed to the second decimal place) in 100 cc. of water; add phenolphthalein and titrate with hundredth normal sodium hydroxide solution: not more than 9 cc. is required *(limit of acids)*.

Transfer about 1 Gm. of saligenin, accurately weighed, to a wide mouthed weighing bottle, dry over phosphorus pentoxide for twenty-four hours: the loss in weight is not more than 0.1 per cent. Incinerate about 1 Gm. of saligenin, accurately weighed: the ash is not more than 0.05 per cent.

DEXTROSE (See New and Nonofficial Remedies, 1935, p. 280).

The following dosage forms have been accepted:

Sharp & Dohme, Inc., Philadelphia and Baltimore.

Dextrose, U. S. P. (d-Glucose), 25 Gm., 50 cc. Ampoule (Unbuffered): Each ampule contains dextrose, U. S. P., 25 Gm., in distilled water, to make 50 cc.

Dextrose, U. S. P. (d-Glucose), 25 Gm., 50 cc. Ampoule (Buffered): Each ampule contains dextrose, U. S. P., 25 Gm., in distilled water, to make 50 cc.; buffered with sodium citrate, 0.25 per cent.

Committee on Foods

ACCEPTED FOODS

THE FOLLOWING PRODUCTS HAVE BEEN ACCEPTED BY THE COMMITTEE ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOLLOWING ANY NECESSARY CORRECTIONS OF THE LABELS AND ADVERTISING TO CONFORM TO THE RULES AND REGULATIONS. THESE PRODUCTS ARE APPROVED FOR ADVERTISING IN THE PUBLICATIONS OF THE AMERICAN MEDICAL ASSOCIATION, AND FOR GENERAL PROMULGATION TO THE PUBLIC. THEY WILL BE INCLUDED IN THE BOOK OF ACCEPTED FOODS TO BE PUBLISHED BY THE AMERICAN MEDICAL ASSOCIATION.

RAYMOND HERTWIG, Secretary.

HERSHEY'S MILD AND MELLOW MILK CHOCOLATE WITH ALMONDS

Manufacturer.—Hershey Chocolate Corporation, Hershey, Pa.

Description.—Milk chocolate containing sugar, cacao butter, milk, roasted almonds and chocolate liquor.

Manufacture.—Milk chocolate prepared as described for Hershey's Milk Chocolate (THE JOURNAL, Feb. 24, 1934, p. 606) is mixed with almonds roasted in cacao butter, molded into bars and automatically wrapped.

Analysis (submitted by manufacturer. Computed from separate analyses of Mild and Mellow Milk Chocolate and almonds and from the factory formula of preparation).—

	per cent
Moisture	0.6
Ash	1.7
Ash insoluble in water	1.3
Ash insoluble in acid	0.01
Fat (ether extract)	37.8
Milk fat	4.9
Total nitrogen	1.4
Protein (noncaffeine and nontheobromine N × 6.25)	8.8
Casein	3.7
Sucrose	39.4
Lactose	6.5
Whole milk solids	16.8
Crude fiber	0.5
Carbohydrates other than crude fiber (by difference)	50.5
*Theobromine	0.1
*Caffeine	0.01

* By Prochnow's modification of the Beckurts-Fromme method, Arch. d. Pharmaz. **247:** 698, 1910.

Calories.—5.8 per gram; 165 per ounce.

Claims of Manufacturer.—Complies with respective United States Department of Agriculture definition and standard.

DROMEDARY BRAND FLORIDA ORANGE-GRAPEFRUIT JUICE (SUGAR SYRUP ADDED)

Manufacturer.—The Hills Brothers Company, New York.

Description.—A blend of the accepted Dromedary Grapefruit Juice—Sugar Syrup Added and Dromedary Orange Juice—Sugar Syrup Added (THE JOURNAL, Dec. 22, 1934, p. 1949).

MARGO CCB

VEGETABLE LECITHIN AND ASSOCIATED PHOSPHATIDES WITH COCONUT BUTTER

Distributor.—American Lecithin Corporation, Atlanta, Ga., and New York.

Manufacturer.—Hansa Muehle, Hamburg, Germany.

Description.—Soy bean lecithin and associated phosphatides with about 25 per cent of coconut fat.

Manufacture.—The method of manufacture is essentially the same as described for Lexin (THE JOURNAL, Dec. 28, 1935, page 2161), excepting that the lecithin residue is admixed with coconut fat (3 to 1).

Analysis (submitted by manufacturer).—

	per cent
Moisture	1.1
Ash	5.1
Petroleum ether extract	63.3
Acetone extract	35.6
Total nitrogen (N)	1.0
Total phosphorus (P)	2.6

Calories.—8.4 per gram; 239 per ounce.

Claims of Manufacturer.—An emulsifying agent for use in foods. Contains readily assimilable phosphorus in organic form.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

535 NORTH DEARBORN STREET - - - CHICAGO, ILL.

Cable Address - - - - "Medic, Chicago"

Subscription price - - - - - Seven dollars per annum in advance

Please send in promptly notice of change of address, giving both old and new; always state whether the change is temporary or permanent. Such notice should mention all journals received from this office. Important information regarding contributions will be found on second advertising page following reading matter.

SATURDAY, FEBRUARY 1, 1936

MECHANISM OF CALCIFICATION

A number of theories have been proposed to explain the phenomenon of the deposition of calcium salts, chiefly calcium phosphate and carbonate, in certain animal tissues. One of the more widely quoted theories [1] attaches most importance to the tension of carbon dioxide in the tissue involved. Serum, it is pointed out, contains calcium and inorganic phosphorus in much higher concentrations than does water alone, partly because of the presence of carbon dioxide in rather large amounts. Likewise, the carbon dioxide tension in active tissues is high and calcium salts remain in solution. In inactive tissues, however, much less carbon dioxide is present and the precipitation of calcium phosphate is thus decidedly favored. A comparison of the amount of carbon dioxide in tissues that are most susceptible to calcification, such as cartilage and the trabeculae of bone, with those not showing calcification bears out this hypothesis. The recent report [2] that more than 16 per cent of adult rats show spontaneous calcification in the pulmonary artery, a region of lowered carbon dioxide content, also may be considered as further evidence in support of the foregoing view.

Another theory [3] holds that the concentration of hydrogen ions in a given tissue is the chief factor controlling the deposition of calcium, an alkaline reaction favoring and an acid reaction retarding calcification. The frequency of calcium deposits in the alveoli of the lungs, the uriniferous tubules and the gastric glands, areas possessing a slightly alkaline reaction because of the elimination of acid at these points, has been cited as evidence favoring the p_H hypothesis.

It has also been suggested that an enzyme, phosphatase, plays a major part in calcification.[4] This catalyst, which is known to be present in many tissues and in particularly high concentrations in the growing portions of the bones of young animals, apparently acts on phosphoric acid esters reaching the tissue, causing the local liberation of phosphate ions and the resultant deposition of calcium phosphate. Recently [5] further evidence that the concentration of phosphate ions in localized areas is an important factor in calcification has been reported. By the use of the ammonium molybdate test, it was shown that the cut end of a muscle contained more phosphate ions than did an uninjured surface. Sensitive electrical measurements demonstrated that the exposed surface was electronegative to the intact tissue. That the electronegative charge was due to the presence of an increased concentration of phosphate ions was further indicated by the fact that the difference of potential disappeared when calcium or barium ions were added to the injured surface and that electronegativity reappeared when the surface was treated with phosphoric acid or with disodium phosphate. Similar results were obtained from experiments on the injured surface of the arteries of dogs. Therefore this work suggests that local calcification of the intimal surface of arteries may result from a combination of calcium ions of the blood with phosphate ions from the injured surface and the subsequent formation of an insoluble calcium phosphate plaque. The rôle of the enzyme phosphatase in this reaction remains to be ascertained.

1. Howland, John: Etiology and Pathogenesis of Rickets, Medicine **2**: 349 (Nov.) 1923.
2. Hueper, W. C.: Spontaneous Arteriosclerosis in Rats, Arch. Path. **20**: 708 (Nov.) 1935.
3. Hofmeister, Franz: Ueber Ablagerung und Resorption von Kalksalzen in den Geweben, Ergebn. d. Physiol. **10**: 429, 1910.
4. Robison, R.: The Possible Significance of Hexosephosphoric Esters in Ossification, Biochem. J. **17**: 286 (1923).
5. Burge, W. E.; Orth, O. S.; Neild, H. W.; Ash, J., and Krouse, R.: Mechanism of Pathologic Calcification, Arch. Path. **20**: 690 (Nov.) 1935.

THE HOSPITAL AND MEDICAL EDUCATION

The many functions which the teaching hospital is supposed to fulfil call for constant study and modification. No better illustration can be given of the thought and work necessary to keep a hospital in its place than the recent report of Dr. Eugene F. Du Bois,[1] physician-in-chief to the New York Hospital. The great menace in the medical sciences at the present time, according to Du Bois, is an overabundance of mediocrity. In a department such as medicine, mediocrity can never be eliminated; but at least certain measures can be taken to check its growth. There must be a spirit of self examination; when comparisons with other institutions are made, only the best in the country are to be considered.

The problems of the hospital fall naturally into several divisions. The routine care of patients and the administration of drugs appear simple, yet they are extraordinarily complex, much more difficult than the fundamental sciences, because they involve not only these fundamental sciences but also the human element. The testing of a new drug or the evaluation of an old one requires a technic and judgment that can be

1. Du Bois, E. F.: Report of the Physician-in-Chief, the New York Hospital, June 6, 1935.

obtained only by the long and strict mental discipline that prevails in hospitals permeated by the spirit of careful investigation. In this attitude the hospital ward has long had leadership. The importance of the dispensary adjunct in the care of patients has often been somewhat neglected. The primary purpose of the latter is the early recognition of disease and the prevention of serious developments. In the New York Hospital this function has been well served by the organization of one large general medical clinic and eleven small special clinics. The general medical clinic tries to perform the functions of the general practitioner, the family doctor, taking care of the great bulk of the patients and referring to the specialists only those who need their special methods of diagnosis or treatment.

Financial problems have, of course, loomed large in recent years. The Cornell Clinic, which was included in the present organization, had been operated for several years as a pay clinic that endeavored to provide adequate medical care for the so-called white collar class, which comes between the ordinary dispensary group and those who can afford to pay their private physician. The patients were charged, on an average, $1.50 a visit, and the doctors were paid at the rate of from $5 to $7 a session. In spite of small quarters, the professional work was maintained at a high standard and the doctors were able to afford to give a considerable amount of time to the clinic. The criticism on the part of the profession at large that the patients were diverted from private practice was met with the argument that the doctors were paid for their services. After the amalgamation no provision was made to pay the doctors, most of whom were suffering acutely from the effects of the depression. They found themselves treating in the dispensary patients whom they would be glad to treat in their own offices for the same fees. The resultant criticisms, Dr. Du Bois feels, have been in the main justified and efforts are being made to correct some of the present faults.

There is no greater help in maintaining high hospital and dispensary standards than the continuous presence of medical students. As previously indicated, emphasis has been placed in the dispensary on teaching, and senior students now spend a greater proportion of their time there. The responsibility for training goes further than medical students, and good facilities are desirable for those more advanced. Although interns are given much responsibility, they are carefully supervised. The residents, who have all previously served internships, obtain a broader experience in special clinics and laboratories and in consultations. The junior members of the attending staff work in the wards and in the dispensary and help in the teaching. Many meetings are organized for the purpose of mutual instruction.

The problem of the part-time and the full-time staff has not proved especially difficult. For the most part there has been harmonious cooperation between the two groups and Du Bois feels, judging from his personal experiences with both forms, that the quality of work does not differ materially. Research is an integral part of the function of the teaching hospital. Because of the close affiliation of the Russell Sage Institute of Pathology and the good equipment of the various departments, both clinical and fundamental research find satisfactory encouragement. The importance of this fact cannot be overestimated, since it is clearly recognized that it is impossible to obtain the services of the best clinicians in an institution that does not foster research.

ETIOLOGY AND TREATMENT OF SPRUE

Adequately financed group investigation frequently yields practical results of great benefit to mankind. The information compiled in Puerto Rico by the members of the Commission of the Rockefeller Foundation for the Study of Anemia, supplemented by animal experimentation at the Hospital of the Rockefeller Institute for Medical Research in New York, is an example of the value of such well organized investigation. The data on the etiology and treatment of sprue [1] are now available, particularly as they concern the conflict between the infectious and the deficiency theories of its causation. The study included careful observations of approximately ninety patients in Puerto Rico, supplemented by special studies of patients at the Thorndike Memorial Laboratory of the Boston City Hospital. Subsequent experiments on animals also are reported.

The blood picture in sprue has frequently been described and the resemblance of the macrocytic anemia to pernicious anemia pointed out. The disturbances of the gastro-intestinal tract have related sprue not only to anemia but likewise to pellagra. In fact, in each of the three diseases there are associated disturbances of the gastro-intestinal tract, of the hematopoietic mechanism and of the central nervous system. True, in different individuals with each disease the extent of the involvement of any of the three systems is variable. Nevertheless it is striking that there has been developed for each of these conditions a method of treatment based on a dietary regimen including meat and milk. The investigations under the auspices of the Rockefeller Foundation have included a detailed study of the influence of dietary factors, the so-called extrinsic factors, and the etiologic significance of a lack of the gastric or intrinsic factor. The studies on the patients, taken together with the results of the administration of defective diets to animals, suggest that sprue is a deficiency disease closely related to addisonian pernicious anemia. In sprue, as in pernicious anemia, there is involved the failure of a reaction between an extrinsic factor in the diet, associated in several foods with vitamin B_2 (G), and an intrinsic factor, present in the gastric contents

1. Castle, W. B.; Rhoads, C. P.; Lawson, H. A., and Payne, G. C.: Etiology and Treatment of Sprue, Arch. Int. Med. **56**: 627 (Oct.) 1935.

of the normal person. In addition, at times there is difficulty with the gastro-intestinal absorption of substances resulting from this hematopoietic reaction. Obviously in different patients with sprue the relative importance of these three factors, namely, the extrinsic factor, the intrinsic factor and absorption, will vary. Dietary deficiency of iron, sometimes accentuated by gastric anacidity and intestinal permeability, may be of importance.

This clear cut exposition of the basis of the etiology of sprue both in the clinical cases and in the experimental studies is supported by the efficacious results obtained by dietotherapy. In experimentally produced conditions simulating sprue, produced in dogs by withholding the dietary extrinsic factor, relief is supplied by liver extract. It seemed likely, therefore, that appropriate dietary defects in man may likewise initiate the physiologic disturbances of the alimentary tract subsequently involved in the production of sprue. This is supported by the effectiveness of the administration of adequate doses of liver extract, especially by parenteral injection. The accessory use of iron is indicated for certain patients. Although there may be objections to the analogies drawn between sprue and pernicious anemia, some of the distinctions that may be pointed out are of little practical importance. The remarkable benefit resulting from the parenteral administration of liver extract to severely sick patients with both diseases would seem to indicate a close relationship between sprue and pernicious anemia; our knowledge of these conditions, particularly of the former disease, has been advanced by the foregoing observations.

Current Comment

HOW CARS GO OUT OF CONTROL

There is a type of automobile accident in which the explanation commonly offered is that "the car went out of control." In many cases, however, according to Henderson,[1] subsequent examination demonstrates that the steering gear, motor and brakes were in good order. It is hence really the motorist who "goes out of control" and the explanation for his action lies in an instinctive reflex, which submerges the conditioned reflex built up by driving a car. The reflex concerned is the "self-righting reflex," which is excited by any sudden disturbance of equilibrium. It is a complex reaction in which the head, body, arms and legs are all involved. When it occurs in the driver of a car, the impulse that dominates him is to steady himself in his seat. He grasps the wheel with his whole strength. His arms stiffen, and he is as likely to steer off the road as along it. Simultaneously, and as part of the same nervous and muscular complex, he performs another act so instinctive that in most cases he is entirely unconscious of it. His legs are forcibly extended and his feet are pressed down hard. It is the muscular act that Sherrington, who discovered it in the dog, named the "extensor thrust." It is thus obvious that in drivers it will result in sudden hard pressure on the accelerator pedal. Since it is impossible to change this reflex, which may occur following an initial jolt or even a mental start, some other means of preventing this type of accident must be discovered. On reviewing a considerable number of accidents, Henderson feels that at least 10 per cent are due to the initiation of this reflex. It is characteristic that the thrust occurs in both legs and hence a clue to the necessary safety measures is readily available. There are some obvious disadvantages in introducing a method by which heavy pressure on the accelerator pedal will close the throttle and slow the car rather than speed it up. There are no similar objections, however, to the introduction of a safety factor under the left foot which on a similar extensor thrust would counteract the tendency to acceleration caused by the right foot. A pedal under the left foot would involve no great difficulties of adjustment for those already accustomed to driving. It would, however, introduce an added factor of safety, which might result in a material decrease in road accidents.

1. Henderson, Yandell: How Cars Go Out of Control: Analysis of the Driver's Reflexes, Science **82**: 603 (Dec. 27) 1935.

RECURRENCE IN ACUTE INFECTIOUS DISEASES OF CHILDHOOD

Most textbooks in medicine assert that one attack of an acute infectious disease in childhood (except influenza, erysipelas and pneumonia) confers a lasting immunity. Ryhiner,[1] in a review of the subject, correctly states that the majority of cases of this type of illness do not come into the hospital; hence hospital statistics would not satisfactorily reflect the true situation. In the sixteen years between 1919 and 1935 he observed more than 5,000 cases of acute infectious diseases. Of the 1,926 cases of measles, a true second infection was observed only twice; there is, he states, a definite difference between relapse with the new appearance of a typical exanthem a few weeks after the first attack. He did not observe a single recurrence of chickenpox in the 599 cases of his series. A similar situation exists with regard to a smaller (361) number of cases of mumps. There were too few cases of diphtheria on which to base a conclusion, though no recurrences were noted. The literature, however, reports many such instances. In whooping cough the immunity seems to be relatively slight. When second attacks occur they seem to be usually at a long interval after the first. Such attacks, however, do not seem to be lighter than the first. The situation with regard to scarlet fever is interesting. Recurrent infections were formerly considered rare but are now believed to be quite common. Out of 220 cases there were seven unquestioned examples of second attacks. It is apparent, therefore, that the question can best be answered by a study of the individual diseases involved rather than a blanket understanding that all these diseases confer a lasting immunity.

1. Ryhiner, P.: Wiederholte Erkrankung an den akuten Infektionskrankheiten des Kindesalters, Schweiz. med. Wchnschr. **65**: 813 (Aug. 31) 1935.

Association News

RADIO BROADCASTS

The American Medical Association broadcasts over WEAF, the Red network instead of the Blue, as formerly, and certain additional stations of the National Broadcasting Company at 5 p. m. eastern standard time (4 o'clock central standard time, 3 o'clock mountain time, 2 o'clock Pacific time) each Tuesday, presenting a dramatized program with incidental music under the general theme of "Medical Emergencies and How They Are Met." The title of the program is "Your Health." The program is recognizable by a musical salutation through which the voice of the announcer offers the toast "Ladies and gentlemen, your health!" The theme of the program is repeated each week in the opening announcement, which informs the listener that the same medical knowledge and the same doctors that are mobilized for the meeting of grave medical emergencies are available in every community, day and night, for the promotion of the health of the people. Each program will include a brief talk dealing with the central theme of the individual broadcast.

Red Network.—The stations on the Red network of the National Broadcasting Company are WEAF, WEEI, WTIC, WJAR, WTAG, WCSH, KYW, WFBR, WRC, WGY, WBEN, WCAE, WTAM, WWJ, WMAQ, KSD, WHO, WOW, WDAF.

Pacific Network.—The stations on the Pacific network are KGO, KPO, KFI, KGW, KOMO, KHQ, KFSD, KTAR.

The next three programs are as follows:

February 4. Pneumonia, W. W. Bauer, M.D.
February 11. Little Tips on Home Hygiene, W. W. Bauer, M.D.
February 18. Heart Disease, Morris Fishbein, M.D.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION, PUBLIC HEALTH, ETC.)

ALABAMA

The Fifty-Seventh Full Time Health Unit.—Early in December a full time health unit was set up in Coffee County, bringing the total of full time health departments in the state to fifty-seven. Ten counties remain without organized health service. Between 1927 and 1932, fifty-four counties were organized, but during the depression eight discontinued their service, newspapers reported. Dr. Henry T. Donovan, Elba, is the health officer.

CALIFORNIA

Association Day at San Diego Fair.—May 26 has been designated as California Medical Association Day at the 1936 California Pacific International Exposition, San Diego, which opens February 12 and will continue to September 9. Activities will be centered in the Palace of Medical Sciences, and exhibits will be sponsored, among others, by the American Medical Association, the San Diego County Medical Society, the California Medical Association, the Los Angeles City and County Health Department, the Chicago Roentgen Club and the Southern California Pathologists Association. In addition to the medical exhibits there will be lectures and daily presentations of motion pictures on medical subjects.

Sentenced for Illegal Practice.—J. E. S. C. Morandi, a Negro preacher, pleaded guilty to three counts of representing himself as a physician, December 6, and was sentenced to pay a fine of $100 or serve twenty-five days in jail on each count. He was committed to jail on the first count, and the sentence on the second and third counts was suspended. In San Diego, Morandi posed as a preacher and also held himself out as a physician, offering to treat members of his church. According to the California State Board of Medical Examiners, records show that he was arrested in Des Moines, March 31, 1931, although the charge was not mentioned. He was also arrested in Ashland, Ky., Feb. 7, 1934, and held for Roanoke, Va., on a statutory charge.

DISTRICT OF COLUMBIA

Medical Bills in Congress.—The following bills have been approved by the President: S. 1016, empowering the health officer of the District of Columbia to authorize the disinterment and reinterment of bodies in cases in which death has been caused by certain contagious diseases; S. 2013, directing the Commission on Licensure to Practice the Healing Art in the District of Columbia to issue a license to practice the healing art to Dr. Pak Chue Chan; S. 2939, directing the Commission on Licensure to Practice the Healing Art to issue a license to practice the healing art in the District of Columbia to Dr. Ronald A. Cox.

Health at Washington.—Telegraphic reports to the U. S. Department of Commerce from eighty-six cities with a total population of 37 million, for the week ended January 18, indicate that the highest mortality rate (22.8) appears for Washington and for the group of cities as a whole, 13.2. The mortality rate for Washington for the corresponding period last year was 18.6 and for the group of cities, 13. The annual rate for eighty-six cities for the three weeks of 1936 was 13.7 as against a rate of 13.5 for the corresponding period of the previous year. Caution should be used in the interpretation of these weekly figures, as they fluctuate widely. The fact that some cities are hospital centers for large areas outside the city limits or have a large Negro population may tend to increase the death rate.

ILLINOIS

Cancer Survey in Illinois.—Dr. Frank L. Rector, Evanston, field representative of the American Society for the Control of Cancer, will in the near future conduct a survey of cancer in Illinois at the request of the Illinois State Medical Society.

Society News.—Dr. M. Herbert Barker, Chicago, discussed pneumonia before the Whiteside County Medical Society, January 23, in Sterling.——Dr. Luke W. Hunt, Chicago, discussed "Scarlet Fever Immunization and Treatment" before the Kankakee County Medical Society, January 9.——Dr. Harry M. Richter, Chicago, discussed surgical aspects of gallbladder disease before the Peoria City Medical Society, January 21.

Chicago

Prenatal Clinics in the Evening.—Two evening clinics for women needing antepartum care were recently opened under the direction of the city health department. Free treatment will be given to women who work during the day. At the opening of the first clinic at 6312 Wentworth Avenue, nurses and physicians on the staff of the Chicago Lying-in Hospital conducted examinations and lectured on antepartum care.

Meeting of Bacteriologists.—The Society of Illinois Bacteriologists presented the following program at its meeting, January 17, at the Chicago Woman's Club:

Dr. Frederick O. Tonney, Bacteriology and Public Health.
Lloyd B. Jensen, Ph.D., Bacteriology and the Meat Packing Industry.
L. S. McClung, Ph.D., Maywood, Ill., The Agglutination Reaction in the Classification of Spore-Forming Anaerobes.
George K. K. Link, Ph.D., Plant Nutrition and Disease Resistance.

Symposium on Chronic Arthritis.—The Chicago Society for the Control of Rheumatic Disease sponsored a symposium on chronic arthritis at the meeting of the Aux Plaines branch of the Chicago Medical Society, January 10. Speakers were Dr. Ralph Pemberton, professor of medicine, University of Pennsylvania Graduate School of Medicine, Philadelphia, on "The Medical Management of Chronic Arthritis," and Dr. Robert B. Osgood, professor of orthopedic surgery, emeritus, Harvard Medical School, Boston, "The Orthopedic Management of Chronic Arthritis." Dr. Ernest E. Irons, dean and clinical professor of medicine, Rush Medical College, and Dr. John D. Ellis, associate in surgery, Northwestern University School of Medicine, discussed the papers.

IOWA

Society News.—Speakers before the Bremer County Medical Society in Waverly, December 5, included Dr. Walter L. Bierring, Des Moines, on "Economics of Disease Prevention."——The Greene County Medical Society celebrated "one hundred and fifty-two years of medical practice" at its meeting in Jefferson, December 19, with Drs. William M. Young, Jefferson, Benjamin C. Hamilton Sr., Jefferson, and John H. Shipley, Rippey, as guests of honor.——At a meeting of the Jackson County Medical Society in Maquoketa, December 20, Drs. James S. McQuiston and William E. Brown, both of Cedar Rapids, discussed "Gait and Movement Disorders" and "Use of the Obstetrical Forcep," respectively.

Graduate Course at Ames.—The speakers' bureau of the state medical society will sponsor a course in diagnosis and therapeutics at Ames about the middle of February, under the

auspices of the Boone and Story county medical societies. The state medical journal announces that the following program has been arranged:

Dr. Percival Bailey, Chicago, Therapeutics in Neurology.
Dr. Oscar H. Plant, Iowa City, Recent Advances in Therapeutics.
Dr. Erwin R. Schmidt, Madison, Wis., Treatment of Diseases of the Gallbladder.
Dr. Henry E. Michelson, Minneapolis, Diagnosis and Treatment of Common Skin Disorders.
Karl W. Stenstrom, Ph.D., Minneapolis, Radiation Therapy.
Dr. Charles D. Creevy, Minneapolis, Treatment of Infections of the Genito-Urinary Tract.
Dr. Cecil J. Watson, Minneapolis, Modern Treatment of Anemia.
Dr. Walter L. Palmer, Chicago, Treatment of Gastro-Intestinal Disorders.

Tentative plans are being made to offer a similar course at Sheldon and to conduct laboratory courses at Creston, Oskaloosa and either Fairfield or Burlington.

MAINE

Society News.—Dr. Shields Warren, Boston, read a paper before the Cumberland County Medical Association, December 19, on "Pathology of Malignant Disease with Relation to Treatment."——The Kennebec County Medical Association was addressed in Augusta, December 19, among others, by Dr. Orwel F. DeVeaux on "Diabetes with Gangrene."——Dr. Edward H. Risley, Waterville, presented a paper before a recent meeting of the Sagadahoc County Medical Society, among others, on "Management of Postoperative Nausea and Vomiting."——At a meeting of the Portland Medical Club, January 7, Dr. Harry Eugene Macdonald Jr. read a paper on neurosurgical congenital anomalies.

Clinics at Maine General Hospital.—The Central Maine General Hospital, Lewiston, has been holding a series of graduate teaching clinics. Future clinics will be conducted by:

Dr. William C. Quinby, Boston, February 28 Daily Problems in the Treatment of Patients with Genito-Urinary Disturbances.
Dr. William B. Castle, Boston, March 27, Medical Aspects of Diseases of the Colon.
Dr. Soma Weiss, Boston, April 17, Clinical Use of Sedatives with Particular Reference to the Barbituric Acid Derivatives.
Dr. Otto J. Hermann, Boston, May 22, Some Aspects of the Management of Fractures.

Clinics were held on January 24 by Drs. Siegfried Thannhauser, Boston, on functional tests in dietary treatment of liver disorders; Joseph H. Pratt, Boston, the neuroses, and Jacob Schloss, newer methods in diagnosis of gastric diseases.

MASSACHUSETTS

Bills Introduced.—S. 321 proposes to direct the department of public health to investigate the necessity for and cost of constructing and maintaining a state hospital for the treatment of infantile paralysis or arthritis, or both. S. 322 proposes to authorize the department of health to construct and maintain a health center for the treatment of infantile paralysis. S. 388, to amend the medical practice act, proposes that one of the members of the board of registration in medicine shall be a graduate of Harvard University Medical School, one a graduate of Boston University School of Medicine, one a graduate of Tufts Medical School, one a graduate of the College of Physicians and Surgeons, one a graduate of the Middlesex College of Medicine and Surgery, and one a graduate of the Massachusetts College of Osteopathy. H. 573 proposes to authorize the organization of corporations to operate "non-profit hospital service plans" for their subscribers or members and to exempt such corporations from the provisions of the state insurance laws and from public taxation. H. 574 proposes to require hospitals receiving public support to permit any physician licensed under the medical practice act to practice within their confines. H. 662 proposes to require, before a physician may remove any organ of a patient's body, (1) the consent of the patient and (2) a written explanation by the physician to the patient as to the necessity of the removal of any organ, and to require further the preservation of any organ removed, until the patient directs its disposal. H. 757 proposes to forbid the manufacture and sale, for household use, of caustic potash, caustic soda or lye, oxalic acid or any of its salts containing the equivalent of 10 per cent or more of oxalic acid, or any ammonia water in concentration of 5 per cent or more, unless the container as retailed bears the word poison conspicuously displayed on the label and also contains the name of applicable antidotes. H. 844, to amend the pharmacy practice act, proposes that the provisions of the pharmacy practice act shall not apply to the manufacture or sale of "patent" and proprietary medicines, provided those intended for internal use do not contain salicylic acid, barbituric acid, acetanilid, phenol, bromine, iodine, or any of their salts or derivatives. H. 846 proposes to require the physician in attendance at the birth of a child to treat the child's eyes, within two hours after birth, with a prophylactic remedy furnished by the state. H. 949 proposes (1) that no person shall be required to submit to any form of vaccination or inoculation as a condition precedent to admission to any school or public institution, or to the exercise of any right, the performance of any duty or the enjoyment of any privilege, and (2) that it shall be unlawful for any person to vaccinate or inoculate a child or an adult without the written consent of the parents or guardians of the child or the written consent of the adult. H. 1045 proposes to authorize liens for physicians and hospitals, treating persons injured through the negligence of others, on any judgment, settlement or compromise obtained by the injured persons by reason of their injuries. The lien, however, is not to apply to awards recovered under the workmen's compensation act. H. 1256 proposes to require each party to a proposed marriage, as a condition precedent to the obtaining of a license to marry, to present to the appropriate official a certificate from a physician that such party is normal mentally and physically and is not afflicted with any communicable disease. H. 1408, to amend the workmen's compensation act, proposes to require an injured employee, in selecting a physician to treat him for industrial injuries, to select a physician named in a list compiled by the department of industrial accidents. The department is to divide the commonwealth into districts and prepare a list of all registered physicians within each district who make application to the department for enrolment on that list. H. 1444 proposes to create an independent board of chiropractic examiners and to regulate the practice of chiropractic. An applicant for a license need have only a high school education and have graduated from chiropractic college after personal attendance of three school years of not less than six months each. A licentiate is to be authorized "to practice chiropractic in all its branches as taught and practiced by the recognized schools and colleges of chiropractic" but is not to be authorized to practice obstetrics or to administer drugs or medicines or to perform surgical operations. H. 1458 proposes to create a board of magnetic healers' examination and registration and to regulate the practice of magnetic healing. Apparently, an applicant for such a license need demonstrate to the board only that he is "capable of examining nerve conditions by his magnetic power." Magnetic healing is defined as "the science of reviving and producing life and circulation in the nerve system and cells, so as to heal all nerve affections."

MICHIGAN

Society News.—At a meeting of the Academy of Surgery of Detroit, December 12, Dr. Frederick H. Cole discussed "Prostatectomy and Transurethral Resection."——Dr. Clarence I. Owen, Detroit, was chosen president elect of the Michigan Pathological Society at the annual meeting in Ann Arbor, December 14.——Dr. Charles M. McKenna, Chicago, discussed "Surgical Kidney with Especial Reference to Stones" before the Calhoun County Medical Society, January 7.

Dr. McQuiggan to Serve as Coordinator.—Dr. Paul F. McQuiggan, Detroit, was appointed director of a newly established medical department of the Wayne County Probate Court, December 1. For the time being, Dr. McQuiggan will serve as coordinator in the administration of the law authorizing free medical care for the indigent. This law, together with a similar one having to do with children, was amended in 1933 to provide for local hospitalization and remuneration for physicians' and surgeons' services. The keynote of the law is rehabilitation.

Memorial Lectures.—A series of graduate lectures on diseases of the gastro-intestinal tract opened at North End Clinic, Detroit, January 9, with Dr. Andrew C. Ivy, Chicago, as the speaker; his subject was "The Important Phases of the Applied Physiology of the Gastro-Intestinal and Biliary Tract." These lectures are designated "The Dr. Max Ballin Memorial Lectures" and other speakers in the series are:

Dr. B. B. Vincent Lyon, January 16, Philadelphia, Diagnosis and Management of Cholecystitis.
Dr. Clark D. Brooks, January 23, Indication for Surgery in Gallbladder Disease and Postoperative Results; Dr. Arthur R. Bloom, Diagnosis of Gallbladder Disease by X-Ray.
Dr. Louis J. Hirschman, January 30, Pitfalls in the Diagnosis of Colon Disease; Dr. Solomon G. Meyers, Interpretation of Gastro-Intestinal Symptoms.
Dr. Frederick A. Coller, Ann Arbor, February 6, Indications for Surgery in Peptic Ulcer and Postoperative Results.
Dr. Leon Bloch, Chicago, February 13, Non-Gastro-Intestinal Diseases Simulating Gastro-Intestinal Diseases (Excluding Neurosis).
Dr. Frederick G. Buesser, February 20, Management of the Peptic Ulcer Patient; Dr. David J. Sandweiss, Newer Methods in the Treatment of Peptic Ulcer.

The Dr. Isaac L. Polozker Memorial Lecture will conclude the series, February 27. Dr. Walter C. Alvarez, Rochester, Minn., will discuss "Nervous Dyspepsia."

MISSISSIPPI

New Health Unit.—The Marshall County Health Department was recently created on a full time basis, newspapers report. Dr. Vernon B. Harrison, formerly health officer of Coahoma County, has been appointed health officer of the new unit. The appointment of Dr. William T. Harper, Fayette, as director of the part time health unit in Jefferson County is also announced.

Society News.—At the annual meeting of the Central Medical Society in Jackson, December 5, speakers were Drs. Paul G. Gamble, Greenville, on "Hydronephrosis Due to Aberrant Vessels"; John Gould Gardner, Columbia, "Injuries About the Elbow," and James S. McLester, Birmingham, Ala., President, American Medical Association, "Borderline States of Nutritive Failure."——The Clarksdale and Six Counties Medical Society was addressed recently, among others, by Drs. J. H. Eugene Rosamond, Memphis, on "Appendicitis in Children," and Leonidas B. Austin, Rosedale, "Pathology of Syphilis."——Dr. James H. Green, Tupelo, among others, addressed the Northeast Mississippi Thirteen Counties Medical Society in Tupelo, December 13, on "Treatment of Peripheral Vascular Disease by Means of Alternating Positive and Negative Pressure."——Dr. Ira B. Seale, Holly Springs, discussed the care and feeding of infants before the Pontotoc County Medical Society in Pontotoc, December 3.

NEW YORK

Society News.—Dr. Edward G. Whipple, Rochester, addressed the Ontario County Medical Society, Canandaigua, at its quarterly meeting, January 14, on "Diagnosis and Treatment of Lobar Pneumonia."

Appointments to Public Health Council.—Governor Lehman appointed two new members to the Public Health Council, January 4, under a new law increasing the membership to eight; Drs. George Baehr, New York, and Clayton W. Greene, Buffalo. Dr. Herman G. Weiskotten, dean, Syracuse University School of Medicine, was appointed to succeed Dr. Frederick F. Russell, resigned. Dr. Simon Flexner, New York, was reappointed chairman.

Resolution on Medical Publicity.—The executive committee of the Medical Society of the State of New York, January 9, adopted resolutions on publicity to inform the public of matters that are the responsibility of organized medicine. The committee on medical trends having found that the point of view of organized medicine cannot be effectively presented through the lay press without direct quotation of individual physicians, the resolution recommended that the rules discouraging personal publicity be relaxed to the extent that requests of the committee on medical trends for statements from physicians be freely granted. It is especially desirable, the resolution continued, that officers of state, district or county medical societies, as well as chairmen of committees and subcommittees be quoted on matters pertaining to the work of the society and, in the event that they are not available, members of such committees and subcommittees.

New York City

Personal.—The New York Physical Therapy Society gave a dinner in honor of Dr. A. Bern Hirsh, January 8, in recognition of his services in the field of physical therapy. Seventy-five persons attended.——Dr. Edward D. Wisely retired in December after twenty-five years as treasurer of the Richmond County Medical Society. The society gave him an onyx desk set.

New Unit at Harlem Hospital.—A new women's pavilion of nearly 300 beds was dedicated at Harlem Hospital, January 4. The building increases the adult bed capacity of the hospital to 607 and adds 114 bassinets. The total cost was $2,500,000. Mayor La Guardia was the principal speaker at the dedication, at which Dr. Sigismund S. Goldwater, commissioner of hospitals, presided.

Society News.—Dr. Charles Mazer, Philadelphia, addressed the Bronx County Medical Society, January 15, on "Uterine Hemorrhage."——At a meeting of the Medical Society of the County of New York, January 27, speakers were Drs. John A. Hartwell, on "The New York Academy of Medicine and Its Relation to the County Medical Society"; Frederic E. Sondern, "The State and County Medical Society," and Haven Emerson, "The Hospital Survey for New York."——Dr. William D. Stroud, Philadelphia, addressed the Medical Society of the County of Kings, January 21, on diagnosis and treatment of cardiovascular disease.

NORTH CAROLINA

Dr. Rosenau Appointed to Faculty of State University.—Dr. Milton J. Rosenau, for many years Charles Wilder professor of preventive medicine and hygiene at Harvard Medical School and in the Harvard School of Public Health, Boston, has been appointed director of a new division of public health at the University of North Carolina School of Medicine, Chapel Hill. The new division, which began operation January 15, is conducted in cooperation with the state board of health, members of whose executive staff will form part of the teaching staff. Dr. Rosenau, who retired from Harvard in 1935, was graduated from the University of Pennsylvania Department of Medicine in 1889 and was for ten years director of the Hygienic Laboratory (now the National Institute of Health) of the U. S. Public Health Service. In 1909 he was appointed to the Harvard professorship in the medical school and in 1922 in the school of public health. From 1913 to 1922 he was director of the school of public health operated jointly by Harvard and Massachusetts Institute of Technology.

OHIO

Society News.—Prof. George Sperti, Cincinnati, addressed the Montgomery County Medical Society, Dayton, January 17, on "Biophysics as It Applies to Medicine."——Dr. Elmer R. Arn, Dayton, among others, addressed the Greene County Medical Society, Xenia, December 3, on carcinoma of the stomach and intestine.——Dr. Henry Kennon Dunham, Cincinnati, addressed the Richland County Medical Society, Mansfield, December 5, on "The Child and Tuberculosis."——Dr. William S. Middleton, Madison, Wis., addressed the Academy of Medicine of Cincinnati, January 7, on "Postoperative Pulmonary Complications."——Dr. Thomas M. Rivers, New York, delivered a Bunts lecture at the Cleveland Clinic, January 20, on "Filtrable Viruses."

New Health Officers.—Dr. Thomas W. Mahoney, Medina, health officer of Medina County, has been appointed health officer of Lucas County with headquarters in Toledo, succeeding Dr. Milton R. Kukuk. Dr. John L. Jones, Cleveland, was chosen to succeed Dr. Mahoney. Dr. Charles F. Thompson was recently appointed health officer of Noble County to succeed Dr. George M. Mason. Dr. Harry G. Southard, Marysville, former state health director, has been made health officer of Union County, succeeding Dr. John D. Boylan, Milford Center. Dr. Chester A. Bennett, Strasburg, has succeeded Dr. Joseph Blickensderfer, New Philadelphia, as health officer of Tuscarawas County, and Dr. J. Will Payne, Willow Wood, has succeeded Dr. Forrest R. Stewart, Ironton, in Lawrence County.

OKLAHOMA

Graduate Course.—The Oklahoma State Medical Association announces that a graduate course will be presented in five cities in the western part of the state beginning February 3. Lecturers, all of Cleveland, will be Drs. Arthur Carlton Ernstene, on "Use of Drugs in the Treatment of Heart Disease" and "Differential Diagnosis of Coronary Artery Disease"; Charles L. Hartsock, "Treatment of Peptic Ulcer" and "Diagnosis and Treatment of Functional Digestive Disturbances," and Robert S. Dinsmore Jr., "Thyroid Problems" and "Handling of the Patient with Gallbladder Disease." The towns chosen for the course are Oklahoma City, El Reno, Enid, Alva and Woodward.

Research Fellowships Available.—The University of Oklahoma School of Medicine announces that three research fellowships in the medical sciences are available at the school through a fund provided by the legislature. Two will carry stipends of $1,200 each and the other a stipend of $1,500. Special equipment and supplies will be furnished. Applicants must furnish certified data showing their qualifications as research workers, the problems they wish to pursue and estimates of the cost of apparatus and supplies needed. Each applicant must also furnish the names of three persons well known in the field of medical education with whom the university may communicate. Any one wishing to obtain one of these fellowships should apply to the dean, Dr. Robert U. Patterson, 801 East Thirteenth Street, Oklahoma City.

PENNSYLVANIA

Annual Tuberculosis Meeting.—The forty-fourth annual meeting of the Pennsylvania Tuberculosis Society will be held in Allentown, February 25-26. "Tuberculosis Prevention and Control in Relation to Industry" and "The Contribution of School Authorities in Tuberculosis Control Measures" will be the topics for discussion. Speakers will include Drs. Kendall Emerson and Haynes H. Fellows, New York; William A.

Sawyer, Rochester, N. Y.; Frederic Maurice McPhedran, George M. Piersol and Harry D. Lees, Philadelphia, and Mr. William G. Moorhead, state superintendent of public instruction. The Pennsylvania Conference on Social Welfare will hold its annual meeting immediately after the tuberculosis meeting.

Philadelphia

Grant for Study of Anesthetics.—The American Philosophical Society has made a grant of $2,500 to the Woman's Medical College of Pennsylvania for a study of the action of anesthetics by the departments of physiology, physiologic chemistry and pathology. Dr. Esther M. Greisheimer will direct the research in physiology, Marion Fay, Ph.D., in physiologic chemistry and Dr. Helen Ingleby in pathology.

County Society to Sponsor Graduate Institute.—The Philadelphia County Medical Society announces a graduate institute to be held at the Bellevue-Stratford Hotel, April 20-24. The subject will be cardiorenal diseases and their ramifications, on which a program of special interest to general practitioners has been prepared with lecturers from among the foremost teachers in Philadelphia. For further information address Philadelphia County Medical Society, Post Graduate Institute, Twenty-First and Spruce streets.

Prepaid Medical Service Subject to Insurance Laws.—Dr. Charles Dudley Saul, head of an organization furnishing medical service to subscribers at $2 a month, was ordered to appear before the state insurance commissioner, January 28, to show cause why he should not be prosecuted for violation of the insurance laws, newspapers reported January 20. The commissioner is quoted as saying in a letter to Dr. Saul that as a result of an investigation it was decided that the Saul clinic is engaged in the business of insurance and is subject to the insurance laws. It was said Dr. Saul had about 700 subscribers, including members of the Newspaper Guild of Philadelphia and Camden, welfare workers, federal employees and residents of a model housing project built by the government.

Society News.—Among speakers who addressed the Physiological Society of Philadelphia, January 20, were Drs. Cyril N. H. Long and Francis D. W. Lukens, on "The Effect of the Adrenotropic Hormone of the Anterior Pituitary upon Hypophysectomized-Depancreatized (Houssay) Cats" and Miss E. G. Fry, "Effect of Adrenalectomy on the Response of the Rat to the Ketogenic Principle of the Anterior Pituitary."——Drs. Herman O. Mosenthal, New York, and Julius Friedenwald, Baltimore, addressed a joint meeting of the North End Medical Society and the north branch of the Philadelphia County Medical Society, January 23, on "Treatment of Chronic Nephritis by the General Practitioner" and "A Consideration of Gastritis, Gastric Ulcer and Cancer and the Anemias Related to Gastric Secretory Disturbances," respectively.——Dr. John M. Fisher was elected president of the Aid Association of the Philadelphia County Medical Society, January 14. The association disbursed $5,895.30 during 1935.

Pittsburgh

Dr. Buchanan Honored.—Dr. John J. Buchanan, for fifty-two years a member of the Allegheny County Medical Society, was guest of honor at the meeting of the society, January 21, at the Hotel Schenley. A program was presented with the following speakers: Drs. Dean Lewis, Baltimore, "Endothelial Tumors"; Edward C. Rosenow, Rochester, Minn., "Focal Infection and Elective Localization," and Joseph Eastman Sheehan, New York, "Application of Skin Grafts (Tube Grafts); Correction of Unilateral Facial Paralysis." At the testimonial dinner Dr. Richard J. Behan, president of the society, was toastmaster. Addresses were made by Dr. George T. Vaughan, emeritus professor of surgery, Georgetown University School of Medicine, Washington, D. C.; Dr. Holland H. Donaldson, surgeon, Mercy Hospital, and W. W. Stoner, president, Allegheny County Bar Association. Dr. Alexander H. Colwell, Pittsburgh, president, Medical Society of the State of Pennsylvania, presented a medallion to Dr. Buchanan, who was a charter member of the Allegheny County society and president in 1920.

RHODE ISLAND

Bills Introduced.—S. 27 proposes to grant to hospitals, physicians, nurses or dentists, treating persons injured through the fault of others, the right to liens on any judgments, compromises or settlements received by the injured persons on account of their injuries. H. 591, to amend the workmen's compensation act, proposes to make some twenty-seven stated occupational diseases compensable. Included among these diseases are anthrax; lead, zinc, mercury, phosphorus and arsenic poisoning; poisoning by wood alcohol; poisoning by benzene (benzol) or its nitro, hydro, hydroxy, or amido derivatives, or by carbon bisulfide or by nitric fumes; chrome ulceration; epitheliomatous cancer; glanders; compressed air illness, miners' disease and dermatitis. H. 598 proposes to create a commission to study the desirability of establishing a health insurance fund and to report its conclusions to the general assembly not later than March 5.

TEXAS

"The Exhibit of Life."—Plans for an exhibit at the Texas Central Centennial Exposition to be held this year in Dallas, to be known as the "Exhibit of Life," were outlined at a conference of representatives of educational institutions of the state in Dallas, December 15. Dr. Edward H. Cary, Dallas, was chairman of the conference. The exhibit will cover the development of all the sciences useful in the propagation and care of human life. The Texas State Medical Association will probably prepare as its share an exhibit of the medical history of Texas and participation of the medical profession of the state in the development of the practice of medicine.

Society News.—Dr. Jeffrey C. Michael, Houston, addressed the Brazos-Robertson Counties Medical Society at Hearne, December 10, on diagnosis and treatment of common skin diseases.——Drs. Homer B. Allen, Brownwood, and James C. Terrell, Stephenville, addressed the Eastland-Callahan Counties Medical Society in December on "Full Thickness Skin Grafting" and "Endometrial Cyst," respectively.——Dr. Elliott M. Mendenhall, Dallas, discussed tuberculosis at a meeting of the Gray-Wheeler Counties Medical Society in December.——At a meeting of the Tarrant County Medical Society, Fort Worth, in December, economic questions were discussed by Drs. Edward H. Cary, Dallas; Louie O. Godley and Thomas B. Bond, Fort Worth.——Drs. Charles Frank Brown and Harold M. Block, Dallas, addressed the Dallas County Medical Society, January 9, on "Juvenile Obesity" and "Birth Injuries in the Eyes of the New-Born," respectively.

VIRGINIA

Bill Introduced.—H. 53, to amend the dental practice act, proposes to impose certain restrictions on advertising in connection with the practice of dentistry. The board of dental examiners is to be authorized to revoke the license of any licentiate "advertising professional superiority or the performance of professional service in a superior manner, or advertising prices, terms, or fees for professional services or advertising by means of large display, glaring light signs, or containing as a part thereof the representation of a tooth, bridge work, or any portion of the human head, or employing or making use of advertising solicitors or free publicity press agents, or advertising any free dental work or free examination, or advertising to guarantee any dental service."

WASHINGTON

Anniversary of Surgical Society.—The silver anniversary of the Seattle Surgical Society was celebrated at its annual meeting, January 31 and February 1, at the King County Hospital. Speakers were as follows:

Dr. Frank Hinman, San Francisco, Surgical Principles Involved in Uretero-Intestinal Implantation.

Dr. Waltman Walters, Rochester, Minn., Recent Advances in Treatment of Lesions of the Biliary Tract; Surgical Lesions of the Suprarenal Gland, Cortex and Medulla.

Dr. Richard B. Dillehunt, Portland, Ore., Injuries of the Elbow in Children.

Dr. Verne C. Hunt, Los Angeles, Achievements in the Surgical Treatment of the Stomach and Duodenum During the Last Twenty-Five Years.

Dr. Willis C. Campbell, Memphis, Tenn., Ununited Fractures of the Humerus.

Dr. Thomas M. Joyce, Portland, Ore., Acute Appendicitis.

Dr. James Tate Mason, Seattle, President-Elect, American Medical Association, was the honor guest at the annual dinner at the Rainier Club. Dr. Mason spoke on "The Future of Medicine" and Dr. Alfred W. Adson, Rochester, Minn., on "The Present Status of Surgery of the Sympathetic Nervous System."

WEST VIRGINIA

Society News.—A symposium on mastoiditis was presented at a meeting of the Cabell County Medical Society, Huntington, December 12, by Drs. Festus O. Marple, Joseph Hallock Moore, Alexander R. MacKenzie, Wesley C. Thomas and William F. Beckner.——Dr. James H. Mendel, Philadelphia, addressed the Ohio County Medical Society, Wheeling, December 13, on diagnosis of diseases of the ear.

Conference of County Secretaries.—The annual conference of secretaries of county medical societies was held at the headquarters of the West Virginia State Medical Association in Charleston, January 7, with the following program:

Dr. Charles G. Morgan, Moundsville, president of the state association, The Work of the Coming Year.
Dr. Andrew E. Amick, Charleston, Infant and Maternal Welfare.
Dr. William W. Strange, Huntington, Getting Rid of Quacks.
Dr. William M. Sheppe, Wheeling, County Programs and Activities.
Dr. Rome H. Walker, Charleston, The Corporate Practice of Medicine.
Dr. Ward Wylie, Mullens, Medical Legislation and the Rôle of the County Secretary in Securing Its Enactment.

The secretaries were guests of the Kanawha Medical Society at a dinner dance at the Daniel Boone Hotel in the evening.

GENERAL

Northwest Regional Conference. — The Northwest Regional Conference will be held in Chicago, February 16, at the Palmer House under the presidency of Dr. Oliver J. Fay, Des Moines, Iowa. The program will be in the form of a symposium, in which the following speakers will take part:

Thomas V. McDavitt of the Bureau of Legal Medicine, American Medical Association, Chicago, Social Security Act and Its Relation to the Medical Profession.
Dr. Harold H. Camp, Monmouth, Ill., Reciprocal Relations Between State Medical Societies.
Dr. Forrest L. Loveland, Topeka, Kan., Standardization of the Activities of the Committees on Medical Economics of the Midwest and Northwest.
Dr. Fred Moore, Des Moines, Interprofessional Relations in the County.

Outbreaks of Meningitis.—Seven cases of meningitis with three deaths have occurred at the state farm at Bridgewater, Mass., it was reported January 15.——A ten day quarantine was imposed in Harrison County, Mo., January 1, because of a case in Daviess County, which is adjacent.——Twenty-five cases of illness including meningitis demobilized a strike of longshoremen in Galveston, Texas, in December, according to newspaper reports. Four deaths from the disease were reported from central Texas with strict quarantine in Milam County. ——The U. S. Public Health Service reported, January 17, that the incidence for the country as a whole has been the highest since 1930. For the four weeks ended December 28, 436 cases were reported, the highest incidence being in the South Central states. Oklahoma reported 54, Texas 36, Kentucky 16 and Tennessee 12.

Five State Graduate Clinic.—The District of Columbia Dental Society will act as host to the Five State Post Graduate Clinic at the Wardman Park Hotel, Washington, March 8-11. A feature of the meeting will be tours of the modern crime laboratory in the new Department of Justice building. These tours, which must be registered for in advance, will be open only to visiting dentists and physicians. A symposium on the biologic concept of dental diseases will be presented, March 9, with the following speakers:

Dr. Edward C. Rosenow, Rochester, Minn., Bacteriologic Aspect of Dental Diseases.
Boyd S. Gardner, D.D.S., Rochester, Minn., Oral Diagnosis from the Clinical Viewpoint.
Dr. William P. Murphy, Boston, Internist's Viewpoint of Dental Diseases in Relation to General Health.

Other speakers on the program will include:

Dr. Clarence O. Simpson, St. Louis, Radiographic Phase and Demonstration of Radiodontic Technic.
George M. Anderson, D.D.S., Baltimore, Pediodontic Phase of Dental Disease with Regard to Orthodontia.
I. L. Furnas, D.D.S., Cleveland, Prosthetic Restoration of Partial Denture Cases.
Vernon J. Lohr, D.D.S., and Edmund J. Bottazi, D.D.S., Washington, D. C., Operative Restoration, Including Crown and Bridge Work and Open Bite Cases.

Clinics will make up the program Wednesday. Physicians and dentists of Maryland, Virginia, West Virginia, Delaware and North Carolina are invited to the clinic, as well as all members of the American Medical Association who wish to attend. Additional information may be obtained from E. T. Lane, D.D.S., 1029 Vermont Avenue, N.W., chairman of the publicity committee.

Medical Bills in Congress.—*Changes in Status:* S. J. Res. 169 has been reported to the House, proposing to authorize Drs. Hugh S. Cumming, surgeon general; John D. Long, medical director; Bolivar J. Lloyd, medical director, and Clifford R. Eskey, surgeon, all of the United States Public Health Service, to accept and wear certain decorations bestowed on them by the governments of Ecuador, Chile, Peru and Cuba. H. R. 10464 has passed the House, providing supplemental appropriations for the fiscal year ending June 30, 1936. The bill makes available the following appropriations, among others, for carrying out the provisions of the Social Security Act: to enable each state to extend and improve services for promoting the health of mothers and children, $1,580,000, to be administered by the Children's Bureau; to enable each state to extend and improve services for crippled children, $1,187,000, to be administered by the Children's Bureau; to enable the United States, through the Children's Bureau, to cooperate with state public welfare agencies in establishing, extending and strengthening public welfare services for the care of homeless or neglected children, $625,000; to assist states, counties, health districts and other political subdivisions of the states in establishing and maintaining adequate public health services, including the training of personnel for state and local health work, $3,333,000, to be administered by the United States Public Health Service; to enable the United States Public Health Service to conduct investigations with respect to diseases and sanitation, $375,000.

CANADA

Western Division of Connaught Laboratories Established.—A division of the Connaught Laboratories of the University of Toronto has been established at the University of British Columbia in cooperation with the department of bacteriology and preventive medicine of the university and the provincial board of health. The arrangement is on a tentative basis for one year. Dr. Claude E. Dolman, Vancouver, has been appointed associate professor and acting head of the department of bacteriology and preventive medicine at the University of British Columbia and director of the Provincial Board of Health Laboratories of British Columbia, continuing on the staff of Connaught Laboratories as a research member. Dr. Randolph J. Gibbons of the laboratories staff will be associated with Dr. Dolman at the Western Division.

Government Services

Public Health Service Needs Physicians

The U. S. Public Health Service will consider applications to fill a number of existing vacancies and also those which will occur about July 1 for second year medical interns. Physicians, not more than 30 years of age, who have graduated from a class A medical college and who have completed, or will shortly complete, one year's internship in an approved hospital are eligible. Applicants should be interested in the service as a career. Appointments effective on and after July 1 to vacancies at marine hospitals and the U. S. Narcotic Farm, Lexington, Ky., will carry a gross compensation of $1,800 a year, from which a deduction of $690 a year will be made if quarters, subsistence and laundry are furnished. Appointments to federal penal and correctional institutions will carry a gross compensation of $1,620 a year, from which an annual deduction of $240 will be made by the department of justice if quarters, subsistence and laundry are furnished. Complete details may be obtained from the Surgeon General, U. S. Public Health Service, Washington, D. C.

Surgeon General Cumming Retires

After sixteen consecutive years of outstanding service as surgeon general of the U. S. Public Health Service, Dr. Hugh S. Cumming retired January 31 from that position. Surgeon General Cumming was born in Virginia in 1869, and graduated at the University of Virginia Department of Medicine in 1893 and at the University College of Medicine, Richmond, in 1894. In the same year he was appointed assistant surgeon in the U. S. Public Health Service; he was appointed passed assistant surgeon in 1899 and surgeon in 1911. During the World War, 1917-1919, Dr. Cumming was public health expert with the U. S. Navy and in 1920 was appointed surgeon general of the U. S. Public Health Service by President Wilson. He was president of the American Public Health Association in 1931. He is a member of numerous scientific organizations and has received many honorary degrees and decorations in this country and abroad. Among other things Surgeon General Cumming's administration of the public health service is credited with completion of the quarantine system, inauguration of preimmigration examinations at American consulates, establishment of a national leprosarium and national narcotic farms, the construction of eight marine hospitals, and with fostering scientific research. He was also active in promoting international sanitation treaties and was an organizer of the Office international d'hygiène publique, representing it on the League of Nations committee. Recently he was appointed by the league a member of an executive committee of ten.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Dec. 28, 1935.

The Annual Congress of Radiology

The ninth annual congress arranged by the British Institute of Radiology was held in London. Dr. G. W. C. Kaye, physicist, of the National Physical Laboratory, discussed modern equipment. He commended the work of Allibone and his collaborators, who had constructed automatically evacuated x-ray tubes and valves which were self protected, shock proof and operated by press buttons. The exciting voltages, at present of the order of from 200 to 300 kilovolts, were being pushed up much higher. Voltages up to 600 kilovolts or more were to be used in St. Bartholomew's Hospital.

RADIATION THERAPY

In radiation therapy, certain principles were emerging. In the treatment of cancer, x-rays, radium or a combination of these were used according to circumstances. In certain superficial cancers, such as rodent ulcer, almost any radiation would heal, whether low voltage x-rays or the beta or gamma rays of radium. Other types of cancer, such as squamous epithelioma of the skin and lip, yielded to a few milligrams of heavily screened radium. But the major problem of malignant disease was the treatment of glandular metastases. X-rays of high output approaching gamma rays in quality and large quantities of radium at a distance from the skin had their advocates. At the Cancer Hospital of London and at the Westminster Hospital 1 Gm. units had been used since 1929, and larger units were now contemplated. The Radium Research Board was now working with 5 Gm. units.

CALCIFICATIONS

Dr. G. Harrison Orton (radiologist) described calcification changes. The majority of such calcifications took place in degenerating tissues or in tissues of which the vitality had been impaired. Every part of an organism that was dead or dying tended to become infiltrated with calcium salts; in fractures decalcification occurred as a result of the hyperemia caused by the injury. With the limb immobilized in splints this hyperemia subsided, but in many cases decalcification continued, for the normal blood supply of an immobilized limb was a relative hyperemia when the limb was functionless. That was why it was important in the treatment of fractures to arrange immobilization so that function was interfered with as little as possible. Though decalcification delayed the union of fractures, it did not prevent it. The chief cause of nonunion was incomplete immobilization. Hence radiologists were familiar with cases of nonunion when two bones of a limb were fractured at the same level; other examples were the neck of the femur and the scaphoid of the wrist. When immobilization was incomplete the connective tissue developing between was broken down and in addition traumatic hyperemia was induced, which led to further decalcification. When the hyperemia subsided there was no continuous connective tissue to be calcified, and sclerosis of the ends of the bones took place, with resulting nonunion. He thought that the treatment of fractures left much to be desired.

BONE GRAFTING

Dr. Orton could find no evidence that transplanted bone lived; indeed, there was considerable evidence to show that it died. Roentgen examination some months after transplantation of a fragment of bone into another showed the transplant denser than the surrounding bone, which meant that it was avascular. It might remain so and be tolerated as a prosthesis, or it might be eliminated as a sequestrum, or it might become intimately adherent to its bed and completely absorbed by a process of erosion, thus setting free calcium, which brought about the formation of new bone. One of the chief uses of bone transplantation was to provide a local store of calcium. Thus a bone transplant said to have taken was one that had become vascularized and decalcified. If it became merely a prosthesis that was tolerated, it was a moot point whether certain unabsorbable material would not be better. The important point for the radiologist to remember was that a successful bone transplant was one that eventually became rarefied.

Dr. Griffith Evans: Pioneer of Veterinary Pathology

Dr. Griffith Evans, army inspecting veterinary surgeon, has died at the age of 100 at Bangor, North Wales. His career was remarkable. Born at Ty Mawyr, Towyn, in 1835, he was descended from one of the five Royal tribes of Wales. He entered the Royal Veterinary College, London, where he qualified M.R.C.V.S. in 1855. In 1860 he was appointed to the army veterinary department. When the American Civil War broke out he was attached to the Royal Artillery at Montreal. He was anxious to visit the field hospitals of the Northern army and, in spite of obstacles put in his way, obtained an interview with President Lincoln, who gave him permission on condition that he helped the wounded and made himself medically useful to the troops. He became on intimate terms with Generals Grant, Meade and Thomas. At McGill University he graduated M.D., C.M. in 1865 and formed a lifelong friendship with Osler. He presented a graduation thesis on tuberculosis, in which he described its infectious nature and advocated open air treatment twenty years before Koch discovered the bacillus. He returned to England in 1870. In 1880 he was serving in India and was asked by the government to investigate surra, a fatal disease of horses, camels, mules and cattle. He discovered that it was due to a trypanosome in the blood. This was the first time that a protozoon was recognized as a cause of disease. It was named Trypanosoma Evansi. Thus he laid the foundation of protozoan pathology. Osler described him as "the man who first saw a pathogenic trypanosome." Not until the next decade was another discovered, Trypanosoma Brucei, by Sir David Bruce in Zululand. This proved to be conveyed by the tsetse fly and to cause disease in animals. In 1882 Evans made another important discovery—that a filaria, named in 1882 Filaria sanguinis-Evansi, occurred in camel's blood. It was only late in life (first by France) that he received adequate recognition and that honors were showered on him. Like Ross and other great scientists in government service he was not adequately appreciated and not well treated. One of his daughters expressed the opinion that if he had been allowed to prosecute his researches his name would have been as well known as that of Pasteur.

The Deficiencies of Modern Diets

The Health Organization of the League of Nations has issued a report on the physiologic bases of nutrition by the technical commission appointed by the health committee. The commission was representative of the most eminent dietitians. Its work was conducted in the light of the proposal of Mr. Bruce (Australian delegate), who urged "the necessity of marrying agriculture and public health in the interests of the latter." The commission declares that deficiencies in important nutrients are a common feature of modern diets and that these deficiencies occur in the protective foods (foods rich in minerals and vitamins) rather than in the energy-giving foods. An adult living an ordinary life in a temperate climate and not engaged in manual work is taken as the basis for reckoning. An allowance of 2,400 calories a day is considered adequate for such a person. For muscular work the supplements are as follows:

light work, up to 50 calories an hour; moderate work, up to 50-100 calories an hour; hard work, up to 100 calories an hour; very hard work, up to 200 calories and upward an hour. For all adults the protein intake should not fall below 1 Gm. per kilogram of body weight, and it should be derived from different sources, of which a part should be animal.

THE PROTECTIVE FOODS

The most important protective foods are given as milk and milk products, eggs and glandular tissues; then green leaf vegetables, fruit, fat fish and meat. Of energy giving foods, unmilled cereals are not rich in protective substances and the more they are refined the less their protective power. Many fats, especially when refined, have little or no protective constituents. The increasing habit of large sugar consumption is regarded with concern, as it tends to lessen the amount of protective foods in the diet. The pregnant woman should be regarded as the member of the population needing the greatest "protection." There is difficulty in arranging a diet for her to provide adequate calcium, phosphorus, iron and vitamins B_1, B_2, C and D. Ordinary diets are usually inadequate in vitamin D, and except in sunny seasons and sunny countries a small ration of cod liver oil should be included in the diet of the pregnant and nursing mother and the growing child. Fish liver oils are the richest sources of vitamin A and also important sources of iodine. An extended use of the potato to replace some of the sugar and highly milled cereals of the ordinary diet is recommended. Potatoes provide extra vitamin C and more readily available calcium and phosphorus than cereals. They also yield more iron and B vitamins than cereals.

VARIETY IN DIET

Although a simple diet may be constituted from a few protective foods so as to be satisfactory, variety in diet tends to safety. White flour is deprived of important elements and should be replaced by less highly milled cereals and potatoes. Milk should be a conspicuous element in the diet at all ages. Fresh vegetables and/or fruit should always enter into the diet.

PARIS

(From Our Regular Correspondent)

Dec. 20, 1935.

All Diplomas to Be Revised

Owing to the great number of practitioners whose registration might have been irregular, especially during the war, a general revision of every diploma was ordered by a recent decree. Every person practicing medicine or dentistry in France must submit for verification the indenture or diploma in pursuance of which he exercises his profession. The verification and authentification will be made by a commission composed of public government medical men, local authorities, university directors and a representative of the local medical society. On the other hand, the town and rural administrations, as well as the tax collectors, are to publish the list of every person in the medical profession in their jurisdiction. If strictly enforced, the law will identify many illegitimate practitioners.

The Tax on the Professions

The tax on the liberal professions initiated long ago is in fact a permit to open an office. Last year the tax was divided into two parts: first, a tax equal for every one; second, a graduated tax figured according to the value of the professional premises, from a tenth for the high rents to a twentieth for the low ones. This change made the tax more equitable, since formerly a doctor with a large family, and consequently a high rent, paid much more than the bachelor for the same professional activity. So the tax has been reduced to the premises used in the business, exclusive of dwellings. But this return to strict equity was harmful for the French budget, in which it created a deficit. So there came a decree, October 31, according to which the tax will be increased by a general raising of what the money experts call "centimes additionnels," i. e., a certain number of centimes added to every franc of the taxes. On the other hand the owners of large clinics and the like, who are supposed to make considerable money, are taxed extra. The tax offers three scales: 5 per cent if the professional premises do not exceed a rent of 4,000 francs in Paris, 3,000 in the smaller cities and 2,400 in the country; 10 per cent if the rent ranges between 4,000 and 6,000 francs in Paris, 3,000 and 4,500 in other cities and 2,400 and 3,600 elsewhere; 20 per cent if the rent is more than 6,000 francs in Paris, and 4,500 or 3,600 in the other places. Suppose a doctor in Paris, with a rent of 21,000 francs, including professional premises estimated to have a rental of 7,000 francs; his patent will be, for a year, 6,660 francs.

Private Hospitals in Distress

Dr. Massart, in the *Concours médical,* sounds an alarm with regard to the Maisons de santé privées. Their situation, especially those owned by physicians, is precarious, and there is danger of their rapid failure. They were initiated fifty years ago, when the progress of surgery necessitated well equipped and organized hospitals, in the days when almost every old public hospital refused to conform to the new standards of asepsis laboratory work, and so on. A little later, especially in provincial towns, the hospital administrations realized that their interest was to organize, in the public nonpaying hospital, some wards or rooms reserved for the paying patients. The local surgeons collaborated with the city administrators and every one was satisfied: the cities, which made an appreciable profit, the doctors, who were free from business worries, and the patients, who found a valuable organization at their service. But this system was admittedly bad for the practitioners on the whole because it created for the appointed surgeons a privilege and left all the other medical men without any way to organize proper accommodations for their patients. It is unjust too, and unlawful, for city administrations to compete with free hospital foundations with the money of taxpayers, as private wards in city hospitals benefited as a rule from the established conditions, organization and special revenues of the old hospitals. Sooner or later it will be necessary to abandon this system and to institute in both private and community hospitals the sound principle of free choice. Meanwhile numerous medical foundations were established with the avowed purpose of attracting the intermediate clientele, the social insurance patients, or groups of employees or wage earners who can afford to pay a moderate return for medical or surgical care. Those hospitals are, generally speaking, supported by private contributions or by wealthy corporations. So the small private hospitals, wedged between the public hospitals, in which the rates are moderate, and the large institutions founded and supported by private charities, are not able to balance their budgets.

Research on the Prevention of Syphilis

Dr. Sonnenberg of the Saint Alexandre Hospital, Lodz, Poland, has communicated to the Académie de médecine the results of nine years' research on the prevention of syphilis by intramuscular injections of an oily suspension of bismuth. He applied his method to the prostitutes of Lodz. He gives an intramuscular injection every two weeks. Of 145 women so treated in 1933-1934, nine, or 6.1 per cent, were nevertheless infected with syphilis. Analysis of these cases shows that the number of failures bears a relation to the small amount of bismuth absorbed, either because insufficient time had elapsed or because the treatment had been stopped or was given irregularly. Some women followed this method of prevention for nine years, and one can say that without it they would have been infected. There was no case of intolerance.

BERLIN

(From Our Regular Correspondent)

Dec. 9, 1935.

Congress of German Gynecologic Society

In October the German gynecologists held their fiftieth convention at Munich. This convention was distinguished from others by the fact that several of the reports were given by representatives of fields other than gynecology. The first paper concerned the problem of sterility. The gynecologist Albrecht of Munich spoke on periodic fertility and sterility. An important prerequisite for the periodicity of fertility is an exact knowledge of the duration of viability of the spermatozoon and of the ovum. The impregnating capacity of the sperm may be retained at the temperature of the abdominal cavity at most for thirty hours but for a substantially longer time at the cooler temperature of the epididymis. Impregnating capacity and motility never correspond; the impregnating capacity is extinguished much earlier than the motility. Experiments on animals are here to be compared with great caution. For the ovum, despite occasional exceptions, the capacity for conception may be set at only a few hours. Doubtless there are in women fluctuations of fertility dependent largely on the duration (generally about fourteen days) of the corpus luteum. This period of duration is not exactly the same in each individual case; the connections of the corpus luteum with other endocrine glands, particularly the hypophysis, cannot be overlooked. The time most favorable to conception is from the ninth to the sixteenth days of the cycle, but it is equally certain that conceptions are possible during the so-called sterile period of the menstrual cycle. The cause of this is that in almost all women occasional phase-shifting occurs, which is conditioned through early or late ovulation. As the cycle seldom runs its course with absolute regularity, the positive calculation of the sterile periods is not possible.

In connection with this subject, Richter of Leipzig spoke on biologic sterility. According to the experimentation of stock breeders it is clearly maintained that inbreeding does not diminish fertility. As a cause of sterility (in animals) a whole series of biologic facts is to be considered, such as, for example, overnourishment, which however can be remedied by restricting the diet. More important, because more frequent, is sterility from undernourishment. The correct combination of foods is also of importance, as is an ample content of calcium, of phosphorus and of vitamin. As shown by experiments performed at Moscow, a greater fertility in animals can be obtained by artificial impregnation than by natural coitus. Nor is the offspring of artificial impregnation in any way inferior.

According to studies by Spiethoof of Leipzig on sterility due to venereal diseases, gonorrhea is more dangerous by far than syphilis. In Germany about 8,000 men and 12,000 women are each year rendered sterile by gonorrhea. Syphilis probably influences fertility indirectly, by its influence on premature birth. Since it may be accepted that from 7 to 10 per cent of stillbirths are attributable to syphilis, the incidence of sterility because of this disease may be estimated at approximately 2,000 to 3,000 annually.

Haselhorst-Rostock emphasizes that salpingography is an important indication for diagnosis. When occlusion of the fallopian tubes is present, as happens in a large percentage of cases of sterility, the success of an operative neostomy depends on different factors. Particularly the tubes should be penetrable to the end. This is most favorable when it is only a question of adhesions to be dissolved. In other cases, in which stenosis of the cervix is present, dilation with curettage is recommended. As regards treatment by means of organ extracts, no uniform interpretation has thus far been obtained, according to the opinions of various clinicians. Grouping all the methods together, one can anticipate success in about 16 per cent of the cases. Prophylaxis is important, particularly for the prevention of inflammations after gonorrhea or after abortions.

According to data gathered from the "sterility consultation hour" at the Women's Clinic of the University of Berlin, as reported by K. F. Schultze, a bilateral tube occlusion was encountered in 40 per cent of 800 cases of sterile women. Complete cure was obtained in about 20 per cent of these cases.

The second topic was the question of the liver and gestation. Von Bergmann as an internist brought out that, as statistics show, gallstones are more frequently found in parous women. Like the endocrine functions the gallbladder experiences in pregnancy a shifting of its neural regulation. It may be concluded that a stone diathesis is present because stones in the choledochus of rats may originate, for example, in vitamin A deficiency or extirpation of the gallbladder. One must keep free from the mechanical interpretation of the etiology of calculi. Transitions from physiologic to pathologic function are rapid. A liver deficient in glycogen is more vulnerable. A fattening of the liver cells renders the liver more capable of resistance. Functional tests are valuable for the research clinic but not for practice. Experimentally, vitamin A can be prophylactically given. A diet deficient in fat but rich in carbohydrate is the most suitable.

The gynecologic report by Heynemann of Hamburg called especial attention to the fact that, when excessive vomiting occurs, hepatic changes of a toxic nature are to be taken for granted. He recommends an increased amount of carbohydrate in such cases. On the other hand it is still debatable whether or not at the same time a certain amount of insulin is suitable. Finally, Schmieden of Frankfort-on-Main pointed out in a surgical report that gallstones are from four to five times more frequent in women than in men. Attacks occur most frequently during pregnancy or generally first begin at that time. Most surgeons, as Schmieden expresses it, ardently desire an early operation for cholelithiasis. The presence of gallstones forms no indication of an interruption of pregnancy. At best one may operate several months after or during the first five months of pregnancy. In one third of the cases, severe cholecystitis leads to miscarriage. Puerperal fever must also be thought of in connection with this disease.

Another So-Called Cause of Cancer

In the autumn of 1934, in several articles appearing in the *Medizinische Welt,* a causative agent of cancer was described which a botanist and bacteriologist, W. von Brehmer, a member of the state biologic institute in Berlin-Dahlem, claimed to have discovered and which was named by him Siphonospora polymorpha. From the first, Prof. Victor Schilling has been particularly vociferous in his objections both to the method and to the results of this discovery. The communications of Dr. von Brehmer became the more obnoxious as they were disseminated widely by means of numerous interviews in the daily press. For a year this publicity caused a great sensation but, as so often happens in the case of stories of a discovery of the cause of cancer, the excitement at length quieted down. Recently, however, an official statement has appeared in the *Reichs-Gesundheitsblatt* under the unusual caption of "Explanation," the more unusual as it concerns Dr. von Brehmer, the functionary of a state institution. In this publication the president of the state board of health makes known the result of an investigation that had been undertaken by an official commission before which Dr. Brehmer had been given the opportunity to present his proofs and to discuss them. This commission was pleased to conclude that although the aforementioned bacillus exists, no causal relationship between the organism and the origin of cancer has been established and that therefore his proof is quite worthless and adds nothing

to a knowledge of cancer. Also the commission found that the palladium electrodes, by which, according to Dr. von Brehmer, the acid content of the blood could be measured, show no definite results. Clinical investigations showed further that of a group of fifty-two patients von Brehmer diagnosed twenty-seven as cancerous and of these seventeen were as a matter of fact without any carcinoma! On the other hand, two patients actually presenting carcinoma were classified as noncarcinomatous by Dr. von Brehmer. He had stated further, on a basis of his examination, that fourteen patients received radiation therapy; yet of these, ten actually received no such treatment. The commission therefore concluded that the investigations of Councilor Dr. von Brehmer "contribute nothing to the knowledge of cancer."

The president of the state board of health then gives voice to the opinion that "neither the determination of cancerous conditions nor the practical treatment of cancer is possible by the methods of Mr. von Brehmer; accordingly such assertions as depend on them are without accuracy."

The Use of Breast Milk

Several years ago it was decreed throughout Germany that breast milk be kept in certain central depots. One year ago the Breast Milk Distribution Depot was established in Berlin. The work of this depot increased to such an extent that larger quarters were soon necessary. The demand for breast milk has steadily exceeded the supply. Within a month of the depot's foundation, 54 liters was given out, and during the eleventh month as much as 320 liters. The central depot was then transferred to the Kaiserin Auguste Viktoria Anti-Infant-Mortality House and Professor Bessau was placed in charge. The women whose breast milk was utilized were, of course, subjected to a thorough examination (including blood tests and tests to ascertain their freedom from tuberculosis); these women received 2.50 marks for each liter furnished. The milk after medical certification was placed in 200 Gm. bottles for use among the prematurely born and undernourished infants. Private individuals paid 5 marks per liter, sick insurance society members and clinics 4.50 marks (the sick insurance societies of Berlin took on themselves 70 per cent of the cost).

Government Control of Lectures on Nutrition

The Reichsarbeitsgemeinschaft für Volksernährung has undertaken to exercise a certain control over the popular lectures delivered throughout the country on the subject of nutrition. It had been found that in this field conditions existed that, in the interest of a true and uniform education, needed to be remedied. Now that the chief bureau of public health of the national socialist party has provided in a preliminary way for suitable popular lectures on nutrition in the various political districts, the control over lectures on nutrition will be exercised in the main by the local headquarters of the national socialists. The purpose of such control is to prevent possible damage to health and to economic conditions. At first an attempt will be made, without the adoption of legal measures, to bring about normal conditions through the issuance by the Reichsarbeitsgemeinschaft of a special certificate for lecturers on the subject of human nutrition. All persons who are planning to deliver, after Oct. 1, 1935, popular lectures on human nutrition must secure a certificate setting forth their professional qualifications and their personal reliability. An exception will be made in the case of authorized physicians or other authorized persons. This lecturer's certificate will be considered a sufficient guaranty that the lectures to be delivered will not be in contravention of the government's health policies or agrarian needs. The government emphasizes that this measure is designed not to restrict but to encourage education of the people on nutritional subjects through public lectures. It is hoped that persons provided with the required certificate will be utilized to the fullest extent as lecturers and that their endeavors will receive ample support from the people.

ITALY

(From Our Regular Correspondent)

Dec. 15, 1935.

The National Surgical Congress

The forty-second national congress of the Società Italiana di Chirurgia was recently held in Bologna, under the chairmanship of Dr. Roberto Alessandri of the University of Rome. The first official topic was cysts and tumors of the lung, by Drs. Pietro Marogna of Sassari and Gherardo Forni of Venice. Dr. Marogna discussed the geographic distribution of echinococcic infestation in Italy, the frequency of its pulmonary localization, which is almost 35 per cent, and the diagnosis. He reviewed the Lamas-Mondino-Prat operation in two stages, which gives the greatest number of recoveries. The method of Posadas is not to be recommended. The Antonucci and Valdoni operations must be observed longer before their value is confirmed. Artificial pneumothorax and phrenicotomy are indicated in cases of abundant pulmonary suppuration and before more serious operations are resorted to. The medical treatments that have been used thus far are useless.

Dr. Forni classifies pulmonary tumors as benign (mature) and malignant (immature). Benign tumors of the lung are rare. Among these, teratomas and dermoid cysts have clinical importance. There is a tendency, based on recent histologic studies, to admit that various tumors which were previously diagnosed as sarcomas have an epithelial origin. In the last twenty years the frequency of pulmonary carcinoma has greatly increased. The etiology and pathogenesis of pulmonary carcinoma are not clarified, although it is admitted that various irritative factors are concerned in its development. No congenital predisposition or exogenous factors exist that predispose to pulmonary carcinoma, which is more frequent in men than in women in a proportion of 4 to 1. The age at which the tumor is most likely to develop is between 50 and 60 years. Pulmonary carcinomas may be differentiated into carcinoma of the hilus, infiltrating carcinoma of the lobule and carcinoma almost surrounding the lung. As the epithelium that lines the respiratory mucosa from the main bronchi to the alveoli is of the same type, one may accept the hypothesis that all carcinomas of the lung are bronchiogenic, originating in either the bronchial or the alveolar epithelium. The disease does not produce pathognomonic symptoms. The local symptoms are those usually observed in other subacute or chronic diseases of the lung, but the pain is more intense. The diagnosis is made by the results of the clinical, roentgen, bronchoscopic and sometimes thoracoscopic examinations. The biopsy, performed by aspirating particles of tumor by lung puncture through the thoracic wall, gives results of slight confirmatory value. The biopsy of the infiltrated glands facilitates the diagnosis, but by the time the glands are infiltrated the tumor has passed the limits in which operation gives favorable results. In the United States the examination of the pleural fluid by Mandelbaum's method is recommended as a diagnostic procedure. The clinical importance of an early diagnosis in pulmonary carcinoma is based on the fact that the tumor may be removed surgically. Lobectomy is indicated in operating on tumors that are circumscribed in a peripheral parenchymal zone and that originate in the smaller bronchial branches. Tumors originating in the main bronchi or its branches can be removed only by a total pneumonectomy. It is advisable to give the patient preoperative care. An artificial pneumothorax from one to three weeks before the operation is useful because it produces gradual collapse of the lung, reduces the mobility of the mediastinum and diminishes the danger of operatory shock.

The anesthesia is important. Cyclopropane and nitrous oxide anesthesia, by the intratracheal route, is much in use. The number of operations for pulmonary tumors, which up to a few years ago totaled 138, has been increased during the last few years by seventeen operations for benign tumors, twenty-four for sarcomas and ninety-four for carcinomas. In eighty-four cases atypical operations were performed (resections, pneumonectomies and cauterizations), which were insufficient and were followed by a high rate of mortality. Lobectomy, in one or more operative stages, was performed in thirty-six cases. As a preliminary operation to one-stage lobectomy, either artificial pneumothorax or phrenico-exeresis was performed. The postoperative results from lobectomy were sixteen deaths, twelve cases with either recidivation or metastases, and eight recoveries. In eighteen cases a total pneumonectomy was performed, with nine deaths, four cases with recidivation and five recoveries. As a whole the progress of surgical exeresis can be considered slow but sure. The combined radium-roentgen-surgical treatments must be observed for a longer time for the evaluation of their results.

During the discussion, Dr. Putzu of Cagliari said that the Casoni reaction is positive in from 60 to 65 per cent of the cases of echinococcic cysts of the lung but is not specific, since a group reaction may produce false results. The results of Ghedini-Weinberg's test are more certain than those of the Casoni reaction. Dr. Fabris maintained that he has seen more than a hundred cases of primary tumors of the lung since 1928. Dr. Alessandri observed that tumors of the lung have increased lately but stated that it cannot be decided whether the increase is actual or is due to the improved diagnosis or to the more frequent performance of necropsies.

THROMBOSIS

The second official topic of the congress was thrombosis and embolism. Dr. Ragnotti differentiates three forms of thrombosis: those originating in the wound of a vessel, septic thrombosis and spontaneous (autochthonous) thrombosis. The evolution of spontaneous thrombosis, which brings in association the danger of the production of embolism, is not clear. The primary cause of thrombus formation is the agglutination of the platelets (white thrombus). Coagulation of the blood (mixed and red thrombi) takes place secondarily. An early diagnosis of thrombosis is necessary for the prevention of embolism. The pulse and the temperature and especially the local symptoms of pain and neurosympathetic disturbances are of value in the diagnosis. Absolute rest and the application of cataplasms form the basis of the treatment.

Dr. Valdoni spoke on postoperative embolism of the pulmonary artery. Organic heart disease is frequently seen in cases of postoperative embolism of the pulmonary artery, according to some authors, in as many as 90 per cent of the cases. In nearly 80 per cent of the cases embolism develops after operations performed either in the abdomen or in the pelvis. The greatest incidence is in patients over 50 years of age. Massive embolism produces sudden death in 40 per cent of the cases; in the remaining cases there is the possibility for the performance of an operation. During the last ten years nine cases of massive embolism ending in recovery after the performance of a Trendelenburg embolectomy have been reported. The speaker discussed also embolism in the limbs, on which 450 operations have been reported up to the present. The arteries of the legs are the most frequently involved and the condition is rapidly followed by secondary gangrene. Embolectomy is not dangerous in this condition, though it should be done early. According to statistics reviewed by the speaker, functional restoration takes place in 76 per cent of the cases in which the operation is performed within six hours of the production of the embolism.

PERICARDITIS

The third official topic was chronic mediastinal pericarditis. Dr. Luisada of Naples was the official speaker for the Società di Medicina Interna.

Dr. Torraca, the official speaker for the Società Italiana di Chirurgia, spoke on the indications for the performance of an operation in adhesive pericarditis. The operation to be performed may be any of the following: cardiolysis (Brauer's operation), phrenico-exeresis (Sauerbruch's technic), endopericardial pericardiolysis (Delorme's operation) and pericardiectomy (Rehn, Schmieden and Sauerbruch's operations for decortication of the heart). Improvement in the technic of pericardiectomy and the better training of the surgeons in this operation will make its results far better than they are at present.

NETHERLANDS

(From Our Regular Correspondent)

Nov. 28, 1935.

Association for Protection Against Aerial Warfare

Several civil authorities, in collaboration with Netherlandic military technicians, taking the initiative, have founded the Association for Protection Against Aerial Warfare, which has the following objectives:

1. Instruction of the population in the developments and the importance of the aerial menace and the means of protection against aerial attacks.

2. Education of the whole population with regard to the measures of protection taken and to be taken by the authorities and the support that may and should be accorded this organization.

3. The publication in all the homes of the chief items of information concerning the measures of protection to be taken by each civilian before, during and after aerial attacks.

4. Active progress in the preparation for individual protection and, if possible, the employment of competent personnel to guide the population, and the procuring of efficient equipment to be placed at the disposal of this organization.

It is probable that all the similar existing organizations will unite their forces, which will facilitate immediate contact with the population.

The Crusade Against Rats in Amsterdam

An intensive campaign against rats is about to begin in Amsterdam. This crusade will consist in a campaign of extermination to be repeated regularly at fixed intervals. The rats will be killed, if possible, in their lurking places. The poison will be spread about. Preparations of bacteria will not be employed. Spring is the most favorable time for beginning the extermination. A second campaign will take place at the end of summer or the beginning of autumn. An intensive publicity campaign in order to assure the collaboration of the population in an effective fight against rats will be launched twice each year. The radio and printed leaflets will be the principal means of promoting publicity. The expense of this campaign against rats is estimated, for the first year, at 30,000 florins ($20,000).

The Echinococcus and Homeless Dogs

Drs. Tenhaeff and S. Ferwerda have published comparative statistics concerning the echinococcus in domestic animals in Mecklenburg and in Friesland, and the menace of homeless dogs as a source of contagion. These dogs eat the waste parts of butchered animals and often contaminate the cattle and the hogs on a farm. A careful control of butchering on the farms is needed. One third of the hogs in Friesland were examined in 1932, and in 1 per cent of these the echinococcus was found. In hogs coming from other provinces vesicular cysts were frequently found. About the time the law

requiring inspection of butchering places went into effect, the cases of echinococcus in cattle were from one and one-half to two times more frequent in Mecklenburg than in Friesland. In man, on the other hand, the disease was twice as common in Friesland as in Mecklenburg. The dogs of the province of Friesland are more frequently infested with Taenia echinococcus than are those of Mecklenburg. In closing, the authors state that homeless dogs and not dogs on leash are the source of contagion for man and animals. The cases of echinococcic infestation have diminished materially in Friesland since the butchering places on the farms have been subjected to inspection. The situation is less favorable in Mecklenburg, where inspection is not obligatory. Tenhaeff and Ferwerda think that inspection of domiciliary butchering places should be required in all the provinces of the Netherlands.

BELGIUM

(From Our Regular Correspondent)

Nov. 28, 1935.

International Congress for the Protection of Childhood

The Congrès international de la protection de l'enfance was held in Brussels in connection with the eleventh session of the Association internationale pour la protection de l'enfance.

THE NEED OF PEDIATRICS IN THE TRAINING OF PHYSICIANS

The first topic on the program, "The present status and the need of pediatrics in the professional training of physicians," was discussed by E. Lesné and Mlle. G. Dreyfus-Sée of Paris, who emphasized that instruction in pediatrics is of paramount importance. They explained the essential criteria and desiderata of pediatricians and presented the following resolution, which was adopted:

1. The course in pediatrics, obligatory for all, should be further developed.
2. The course should be followed by a theoretical and practical examination in puericulture and pediatrics.
3. Admission to positions requiring the services of physicians skilled in hygienic organization and the care of children should be reserved to physicians holding a university certificate in puericulture and pediatrics, based on studies pursued following special courses extending over one or two years.

THE PRENUPTIAL EXAMINATION

In presenting the second topic, "The Prenuptial Examination: Eugenic and Therapeutic Preventive Measures," G. Schreiber of Paris presented a classification of these measures, which he divides as follows:

Marriages that should be absolutely disapproved: The following diseases should be regarded as absolutely prohibitive of marriage: cancer, grave tuberculosis; chronic alcoholism; aneurysms, aortitis; hemophilia; neurosyphilis, tabes, dementia praecox, multiple sclerosis, severe epilepsy; incurable mental diseases; homosexuality.

Marriages that should be disapproved temporarily: Herein are included marriages that would unite couples in spite of the fact that one or both partners are affected with a contagious disease harmful to at least one party to the contract and to the offspring, although the danger may be removed after institution of systematic and prolonged treatment. Under this head may be placed active tuberculosis, which entails only a minimal danger for the marriage partners but a grave danger for the offspring, and venereal diseases during the period of contagion.

Marriages that may be approved provided certain precautions are taken: This includes marriages in which one of the proposed partners is affected with tuberculosis that is apparently inactive, gonorrhea of long standing, or noncontagious syphilis.

Marriages that may be approved without reservations: This comprises marriages in which there is no menace on the horizon that might compromise the health of either marriage partner or that of future offspring (descendants of cancerous persons; young women who are amenorrheic but without genital malformation; healthy descendants of parents affected with certain familial diseases).

PROPHYLAXIS OF TUBERCULOSIS

P. F. Armand-Delille thinks it would be well to apply the BCG method more generally and to administer the vaccine systematically by the oral route to all the new-born, during the first ten days after birth. If the child is born in a contaminated environment, absolute isolation is needed and should be maintained until the appearance of a positive skin reaction, the proof of the impregnation of the organism by the premunizing BCG vaccine. He advises repeating the vaccinations (preferably by the subcutaneous route) at sufficiently close intervals.

The premunizing potency of the BCG vaccine and its duration have never been exactly ascertained. Moreover, even in children who have been correctly vaccinated true tuberculous manifestations have been observed, usually attenuated but sometimes grave. One should therefore exercise caution when it is a question of allowing vaccinated children to remain in constant contact with a carrier of tubercle bacilli.

The Red Cross in the Belgian Congo

Mr. Jean Ghilain, official representative of the Red Cross Society of the Belgian Congo, in his address at the inauguration of the new center of social medicine at Léopoldville sketched the work accomplished by his branch of the Red Cross. He referred to the creation of local publicity and educational centers, dispensaries and consultation centers for young mothers. He described the initiative that the society had taken in the fight against leprosy in the Népoko region and against venereal disease along the equator and in Katanga. The local committee of Léopoldville acquired in 1928 the idea of creating a center of social medicine in the native quarter of Kinshasa. The beginnings of this center were difficult; in 1933, however, recoveries were effected in 627 cases of syphilis and in 117 cases of gonorrhea in women.

A gift from Queen Elizabeth in 1929 was the basis for the construction of this center in Léopoldville. The center today comprises four pavilions, containing a polyclinic, an antivenereal dispensary, an antituberculosis dispensary and a consultation department for young mothers. This happy arrangement makes it possible for the personnel of each pavilion to preserve its independence and to work constantly in collaboration with the personnel of the other pavilions.

New Edition of the Physicians' Guide

A new edition of the professional guide for Belgian physicians has just appeared. The book begins with information on the organization of professional defense and then takes up the composition of the nineteen special commissions charged with the study of various professional questions. Chapters follow on: Administrative social medicine (tariff schedules, contracts, various regulations); medical service for indigents; occupational accidents. Antituberculosis crusade. Child hygiene. Belgian legislation on public hygiene and practice of the medical profession. Information of a fiscal nature: income tax; law pertaining to stamps, taxes and the like. Medical certificates: model forms for an ordinary medical certificate and for special certificates (occupational accidents; internment of the insane; attestation of death, and the like). Medical fees: résumé of legislation; documentary evidence in connection with contestation of fees. Insurance in relation to the medical profession: group insurance reserved for members of the Belgian Medical Federation; professional civil responsibility insurance; individual insurance; insurance for household workers. Federal library. Organization of hygiene in Belgium.

Marriages

ALLAN SIMPSON CHRISMAN, Asst. Surg., Lieut. (j. g.), U. S. Navy, Charlotte, N. C., to Miss Eleanore Krekeler of Montclair, N. J., Dec. 21, 1935.

PAUL DOUGLAS CAMP JR., Richmond, Va., to Miss Nellie Cornelia Staves in Schenectady, N. Y., Dec. 7, 1935.

EDGAR JACKSON EVANS JR., Denville, N. J., to Miss Isabell Hoffman of Allentown, Pa., Dec. 28, 1935.

GYPSIE J. DOBYNS, Phoenix, Ariz., to Miss Virginia Jane Herron of Salinas, Calif., in January.

FRANK H. CANTLIN, Philadelphia, to Miss Ann Louise Kearney of Shamokin, Nov. 30, 1935.

J. WITHINGTON EATON, Goffstown, N. H., to Miss Eudelle Parks of Londonderry, Dec. 1, 1935.

JAMES T. EMERT, New York, to Miss Barbara Hatch of Sharon, Conn., Dec. 21, 1935.

WALTER E. KOTANCHIK, Shamokin, Pa., to Miss Helen Smith of Watsontown, recently.

Deaths

Thomas Clark Chalmers, Forest Hills, N. Y.; Bellevue Hospital Medical College, New York, 1897; member of the House of Delegates of the American Medical Association, 1919-1930; member of the Medical Society of the State of New York; past president of the Medical Society of Queens County, and chairman of the board of trustees, 1924-1931; past president of the Medical Association of the Greater City of New York, and the Society of Medical Jurisprudence; fellow of the American College of Physicians; pediatrist to the Cornell University Dispensary, New York, 1903-1911; attending pediatrist to the Jamaica (N. Y.) Hospital, 1913-1916; attending physician and pediatrist to the Flushing Hospital, 1915-1923; since 1915 attending physician to the Queensboro Hospital, and president of the medical board, 1915-1921; member of the executive committee and representative of Queens County, advisory council, City of New York Department of Hospitals; served in various capacities on the New York National Guard, and as major surgeon during the Spanish-American War; aged 67; died suddenly, Nov. 16, 1935, in Exeter, N. H., of heart disease.

Ward Brinton ⊕ Philadelphia; Jefferson Medical College of Philadelphia, 1894; formerly instructor in medicine, University of Pennsylvania School of Medicine, and clinical professor of medicine, Woman's Medical College of Pennsylvania; first chief of the division of tuberculosis, department of public health; formerly secretary of the Pennsylvania Tuberculosis Society; veteran of the Spanish-American and World wars; for many years on the staff of the Philadelphia General Hospital; at various times on the staffs of the Phipps Institute, White Haven (Pa.) Sanitarium, Protestant Episcopal Home for Consumptives, Babies' Hospital and the Eagleville (Pa.) Sanatorium; aged 62; died, Dec. 29, 1935, in the Pennsylvania Hospital.

Willis F. Westmoreland, Atlanta, Ga.; Atlanta Medical College, 1885; fourth vice president of the American Medical Association in 1896; member and past president of the Medical Association of Georgia, and the Southern Surgical Association; fellow of the American College of Surgeons, emeritus professor of surgery and clinical surgery, Emory University School of Medicine; past president of the state board of health; surgeon to St. Joseph's Infirmary and consulting surgeon to the Grady Hospital; aged 71; was found dead, Dec. 4, 1935.

Stanley Sinclair Smith ⊕ Pittsburgh; Jefferson Medical College of Philadelphia, 1896; professor of ophthalmology, University of Pittsburgh School of Medicine; member of the American Academy of Ophthalmology and Oto-Laryngology; fellow of the American College of Surgeons; served during the World War; on the staff of the Eye and Ear Hospital, Pittsburgh, Columbia Hospital, Wilkinsburg, and the Carnegie Institute of Technology; aged 61; died, Dec. 2, 1935, of coronary thrombosis and myocarditis.

Silber Charles Peacock ⊕ Chicago; Rush Medical College, Chicago, 1925; served during the World War; assistant attending physician at the Children's Memorial Hospital, and acting director of the Otho S. A. Sprague Memorial Institute Laboratory; head of the department of pediatrics, Henrotin Hospital; on the staff of the Ravenswood Hospital; aged 41; was found in his car murdered, January 3, after he had responded to a false telephone call to attend a sick child.

Thomas Henry Snowwhite, Braddock, Pa.; University of Pittsburgh School of Medicine, 1913; member of the Medical Society of the State of Pennsylvania; demonstrator of surgical anatomy at his alma mater; fellow of the American College of Surgeons; served during the World War; president of the board of education; gynecologist to the Braddock General Hospital; aged 44; died, Nov. 22, 1935, of malignant hypertension.

Henry Wald Bettmann ⊕ Cincinnati; Medical College of Ohio, Cincinnati, 1890; professor of medicine, University of Cincinnati College of Medicine; member and past president of the American Gastro-Enterological Association and fellow of the American College of Physicians; past president of the Cincinnati Academy of Medicine; on the staff of the Jewish Hospital; aged 67; died, Dec. 5, 1935, of coronary thrombosis.

Samuel Eugene Harmon ⊕ Columbia, S. C.; University of Tennessee Medical Department, Nashville, 1899; president of the South Carolina Medical Association; member of the Associated Anesthetists of the United States and Canada; fellow of the American College of Surgeons; visiting surgeon to the Columbia and Baptist hospitals; aged 64; died suddenly, Dec. 26, 1935, of coronary thrombosis.

Henry Kent Hooker ⊕ Clinton, Ill.; Chicago Homeopathic Medical College, 1903; served during the World War; for twelve years member of the high school board of education, and city physician; connected with the Edmonson Clinic; aged 60; on the staff of the John Warner Hospital, where he died, Nov. 21, 1935, following an operation for appendicitis.

Henry G. Woutat ⊕ Grand Forks, N. D.; University of Minnesota College of Homeopathic Medicine and Surgery, Minneapolis, 1897; member of the Radiological Society of North America; fellow of the American College of Surgeons; on the staff of the Grand Forks Deaconess Hospital; aged 62; died, Nov. 27, 1935, of coronary disease.

Edward Dewitt Wagoner, Burrows, Ind.; Medical College of Indiana, Indianapolis, 1903; member of the Indiana State Medical Association; past president of the Carroll County Medical Society; formerly county coroner; aged 61; died, Nov. 23, 1935, in the Methodist Hospital, Indianapolis, of septicemia, coronary thrombosis.

Charles Edward Nickson ⊕ Independence, Mo.; Medico-Chirurgical College of Kansas City, 1904; member of the Radiological Society of North America; on the staff of the Independence Sanitarium and Hospital; aged 62; died, Nov. 6, 1935, in Kansas City, of heart disease and pulmonary embolism.

Lester Bogue Rhamy ⊕ Wabash, Ind.; Indiana University School of Medicine, Indianapolis, 1928; formerly secretary and vice president of the Wabash County Medical Society; on the staff of the Wabash County Hospital; aged 37; died, Nov. 19, 1935, in the Pokegama (Minn.) Hospital, of tuberculosis.

William Thorndike ⊕ Milwaukee; Harvard University Medical School, Boston, 1896; assistant medical director of the Northwestern Mutual Life Insurance Company; aged 65; died, Nov. 23, 1935, in the Columbia Hospital, of chronic lymphatic leukemia, and gastro-intestinal hemorrhage.

Harry Ralph Wormley ⊕ Rockford, Ill.; Rush Medical College, Chicago, 1906; member of the American Academy of Ophthalmology and Oto-Laryngology; on the staff of the Rockford Hospital; aged 56; died suddenly, Nov. 20, 1935, of heart disease, while on a hunting trip in Iowa.

George David Lockie, Springfield, Ill.; National Medical University, Chicago, 1898; member of the Illinois State Medical Society; veteran of the Spanish-American and World wars; aged 65; on the staff of St. John's Hospital, where he died, Dec. 25, 1935, of multiple sclerosis.

James Bernard O'Connor ⊕ Lowell, Mass.; College of Physicians and Surgeons, Baltimore, 1892; formerly member of the local school committee; aged 67; on the staff of St. John's Hospital, where he died, Dec. 22, 1935, of enlarged prostate and diverticulitis.

Abram A. Hershman ⊕ New Haven, Conn.; Yale University School of Medicine, New Haven, 1908; member of the New England Obstetrical and Gynecological Society; on the staff of the Grace Hospital; aged 49; died, Nov. 11, 1935, of brain tumor.

Louis Edward Brinker, Cincinnati; University and Bellevue Hospital Medical College, New York, 1900; member of the Ohio State Medical Association; on the staff of the Good Samaritan Hospital; aged 59; died, Dec. 23, 1935, of coronary occlusion.

Gustavus Dedman Lillard ⊕ Lawrenceburg, Ky.; University of Louisville Medical Department, 1893; past president of the Anderson County Medical Society; formerly member of the city council; aged 70; died, Nov. 24, 1935, of coronary embolism.

Robert Wilcox, Pascoag, R. I.; Long Island College Hospital, Brooklyn, 1878; medical examiner in Burrville and North Smithfield; formerly member of the state legislature; aged 81; died, Nov. 15, 1935, of chronic nephritis, myocarditis and arteriosclerosis.

O. A. Oredson, Duluth, Minn.; Minneapolis College of Physicians and Surgeons, medical department of Hamline University, 1903; aged 63; died, Nov. 25, 1935, in St. Mary's Hospital, of myocardial insufficiency and pulmonary embolism.

Frank Albert Birnbaum, Marathon, Wis.; Marquette University School of Medicine, Milwaukee, 1927; member of the State Medical Society of Wisconsin; aged 34; died, Nov. 27, 1935, in St. Mary's Hospital, Wausau, of lobar pneumonia.

Lucien Eldred Larche, Bastrop, La.; Memphis (Tenn.) Hospital Medical College, 1909; member of the Louisiana State Medical Society; member of the city council; aged 51; died in December 1935, at a hospital in Monroe, of pneumonia.

Leslie Woodruff Snow ⊕ Salt Lake City; Jefferson Medical College of Philadelphia, 1886; on the staff of the Dr. W. H. Groves Latter-Day Saints Hospital; aged 73; died, Nov. 28, 1935, of carcinoma of the prostate and diabetes mellitus.

Ira David Bowser, Reynoldsville, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1906; member of the Medical Society of the State of Pennsylvania; aged 52; died, Nov. 25, 1935, of pneumonia following a gunshot wound.

Joseph Edward Hurley, Rochester, N. Y.; University of Buffalo School of Medicine, 1909; member of the Medical Society of the State of New York; aged 56; died, Nov. 21, 1935, of cirrhosis of the liver and gastric hemorrhage.

John Arnold Board, Altavista, Va.; Medical College of Virginia, Richmond, 1913; member of the Medical Society of Virginia; aged 44; was found dead, Dec. 18, 1935, of an accidental gunshot wound received while hunting.

John Hagerty Bishop, Carversville, Pa.; Georgia Eclectic Medical College, Atlanta, 1881; also a dentist; Civil War veteran; aged 86; died, Dec. 25, 1935, in the Doylestown (Pa.) Hospital, of injuries received in a fall.

Nathaniel Z. Dunkelberger, Kutztown, Pa.; Medico-Chirurgical College of Philadelphia, 1890; member of the Medical Society of the State of Pennsylvania; aged 71; died, Nov. 6, 1935, of cerebral hemorrhage.

Rupert Connor Herrick ⊕ Gilmore City, Iowa; State University of Iowa College of Medicine, Iowa City, 1908; past president of the Pocahontas County Medical Society; aged 50; died, Nov. 22, 1935, of heart disease.

Louis E. Blair, Albany, N. Y.; Albany Medical College, 1881; member of the Medical Society of the State of New York; aged 78; died suddenly, Dec. 8, 1935, of arteriosclerotic heart disease and coronary occlusion.

Joseph Z. Heston, West Jefferson, Ohio; Columbus Medical College, 1889; formerly member of the board of education; aged 78; died, Nov. 26, 1935, in the Mount Carmel Hospital, Columbus, of cerebral hemorrhage.

F. Nolan Thorpe, Boyleston, Ind.; Central College of Physicians and Surgeons, Indianapolis, 1905; member of the Indiana State Medical Association; aged 57; died, Nov. 25, 1935, of mitral insufficiency and nephritis.

Solomon Milton Linville, Lexington, Ky.; Kentucky University Medical Department, Louisville, 1905; aged 55; died, Nov. 18, 1935, in the Veterans' Administration Facility, of coronary thrombosis.

Charles Shepherd Webb, Bowling Green, Va.; University of the City of New York Medical Department, 1875; member of the Medical Society of Virginia; formerly mayor; aged 89; died, Nov. 28, 1935.

Frederick A. Roberts, Pittsfield, Mass.; College of Physicians and Surgeons, Baltimore, 1897; member of the Massachusetts Medical Society; aged 72; died, Nov. 30, 1935, of angina pectoris.

William T. Pride, Madison, Ala.; Tulane University of Louisiana Medical Department, New Orleans, 1895; member of the Medical Association of the State of Alabama; aged 70; died, Nov. 19, 1935.

George Gilbert Barnett, Ishpeming, Mich.; Rush Medical College, Chicago, 1884; member of the Michigan State Medical Society; formerly mayor and city health officer; aged 82; died, Dec. 5, 1935.

Charles Raymond Dwyer, Broomall, Pa.; Jefferson Medical College of Philadelphia, 1926; aged 35; died, Nov. 16, 1935, in the Delaware County Hospital, Drexel Hill, of Hodgkin's disease.

Joseph Tanno, Cleveland; Regia Università di Napoli. Facoltà di Medicina e Chirurgia, Italy, 1902; aged 57; died, Nov. 29, 1935, of hypertension, arteriosclerosis and coronary thrombosis.

Charles S. Crockett, Lincoln, Ark. (licensed in Arkansas in 1903); member of the Arkansas Medical Society; aged 58; died, Dec. 7, 1935, in a hospital at Siloam Springs, of myocarditis.

Sara J. Lloyd, Detroit; Michigan College of Medicine and Surgery, Detroit, 1891; aged 85; died, Dec. 2, 1935, in the Deaconess Hospital, of hypostatic pneumonia and fractured femur.

Frederick Falk ⊕ Seattle; University and Bellevue Hospital Medical College, New York, 1899; served during the World War; aged 62; died, Nov. 28, 1935, of coronary thrombosis.

Cyrus Burford Weller, Austin, Texas; University of Texas School of Medicine, Galveston, 1908; aged 54; died, Nov. 26, 1935, in the Brackenridge Hospital, of chronic myocarditis.

Orwin E. Howe, Washington, D. C. (licensed in the District of Columbia in 1894); aged 82; died, Nov. 6, 1935, in the Washington Sanitarium and Hospital, Takoma Park, Md.

Edward Samuel Hull, Milton Junction, Wis.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1891; aged 82; died, Dec. 4, of carcinoma of the genito-urinary tract.

Marion W. Jinks, Suwanee, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1910; aged 66; died, Dec. 8, 1935, of acute nephritis due to dental sepsis.

Matthew Thomas Cummiskey, Brooklyn; University and Bellevue Hospital Medical College, New York, 1899; aged 71; died, Dec. 12, 1935, of carcinoma of the liver.

Carroll Monroe Lovell, Dickson, Tenn.; Vanderbilt University School of Medicine, Nashville, 1876; formerly mayor and postmaster; aged 85; died, Nov. 17, 1935.

James Marmaduke Boddy, Minneapolis; Albany (N. Y.) Medical College, New York, 1905; aged 70; died, Nov. 17, 1935, of coronary thrombosis and chronic nephritis.

William John D. Lawrence, Gadsden, Ala.; Vanderbilt University School of Medicine, Nashville, 1886; aged 74; died, Nov. 5, 1935, in Birmingham, of pneumonia.

Charles A. Ingraham, Cambridge, N. Y.; Albany (N. Y.) Medical College, 1878; aged 83; died, Nov. 24, 1935, of chronic myocarditis and coronary thrombosis.

Willis Leroy Tucker, Hinsdale, Mass.; College of Physicians and Surgeons of Chicago, 1893; served during the World War; aged 63; died, Nov. 7, 1935.

Le Baron Botsford Wilmot, Winnipeg, Manit., Canada; McGill University Faculty of Medicine, Montreal, Que.; 1901; aged 61; died, Oct. 17, 1935.

Richard G. Callihan ⊕ Luray, Mo.; Keokuk (Ia.) Medical College, 1891; president of the Clark County Medical Society; aged 66; died, Nov. 28, 1935.

Leon Harvey Goodale ⊕ Nashua, Iowa; Hahnemann Medical College and Hospital, Chicago, 1887; aged 72; died, Dec. 5, 1935, of cerebral hemorrhage.

Ernest Elmer Wishard, Chicago; Medical College of Indiana, Indianapolis, 1900; aged 60; died, Nov. 27, 1935, of acute coronary artery occlusion.

Robert Nicholas Daley, Boston; Harvard University Medical School, Boston, 1894; aged 65; died, Nov. 16, 1935, of chronic myocarditis.

Archibald McCallum, Gulfport, Miss.; Kentucky School of Medicine, Louisville, 1879; aged 80; died, Nov. 6, 1935, of chronic myocarditis.

Lewis Bernhard Parks, Cadiz, Ohio; University of Pittsburgh School of Medicine, 1910; aged 49; died, Nov. 23, 1935, of heart disease.

Luther F. Worley, Mazon, Ill.; Missouri Medical College, St. Louis, 1887; aged 77; died Nov. 22, 1935, of chronic myocarditis.

William McKinley Carter, Bell, Calif.; University of Illinois College of Medicine, Chicago, 1920; aged 40; died, Nov. 2, 1935.

Alfred P. Hanchett, Council Bluffs, Iowa; Chicago Homeopathic Medical College, 1878; aged 83; died, Dec. 8, 1935, of uremia.

Correspondence

THE OWNERSHIP OF X-RAY FILMS

To the Editor:—In an editorial in THE JOURNAL, Oct. 12, 1935, page 1193, on the decision of the Supreme Court of Michigan that an x-ray film made of a patient by, or for, his physician in the course of the study of the case, and necessarily a part of the record, is the property of the doctor by whom it was made, although paid for by the patient, unless he has entered into an agreement waiving ownership, you comment on the "successful issue" of the case. You close with the words "the decision leaves undetermined the questions whether a patient personally or through physicians, or others employed by him, has a right to inspect a roentgenographic negative while it remains in the possession of the physician who made it, or to require on payment of a reasonable cost, that prints of the negative be furnished to him." You end your editorial with the additional comment that the decision "is a distinct advance in the settlement of a troublesome and important question."

There are several points of view in this most "important question" that need to be decided by the courts, and the Michigan decision serves only as a basis for discussion. The court finally must elucidate this matter! Why not now? Whose interests are paramount: the collector of data on which, in part at least, a diagnosis is made or confirmed, or the patient whose pathologic condition is bound to change for better or worse and who cannot perhaps carry around with him the physician who made and holds the pictures, whose possession of them is legalized by this decision? If it were necessary to decide the question at once and finally, I should say that since the profit in roentgenology is so great it seems to me that the taker of the original film could supply a 4 by 6 photograph of the film, or of such of the films as established the diagnosis, for passing on to the patient. In chest cases such a course is so just and necessary that one is led to wonder why it is not generally applicable. A patient with lung tuberculosis may seek the advantage of a change in climate after a lung compression. The doctor in the new location would like to know the progress of the lung condition, and this can be well understood only by a study of such films as have been taken to record the changes due to various means of therapy. To meet this situation, a sanatorium which I was instrumental in founding as an eleemosynary institution began its career twenty-five years ago by requiring a satisfactory x-ray plate of the chest of every patient that entered, and the signing of an agreement that these plates and subsequent ones made at the institution at a cost of $2 each to the patient became the permanent property of the institution. This was due to a suit in southern California about that time for $50,000 against a sanatorium because the patient claimed that a subsequent plate showed she had never had pulmonary tuberculosis. It is obvious that the evidence of the sanatorium record in that case would have been strengthened greatly by the possession of the first plate, had one been taken. We all know that even a cavity may heal so that no trace of the tuberculous process may show. Then too, the evidences of latent or obsolete tuberculosis may be of great importance in a patient subsequently developing silicosis. There are so many reasons why a copy (not a print) of the original roentgenogram is of more value to the patient than to the doctor who makes his diagnosis, often on the evidence only of the roentgenogram, that every first class sanatorium for lung cases sends along its x-ray plates with patients returning to distant places either as a loan or with the understanding that they are given to the patient for the help of the physician under whose care the patient comes in event of subsequent trouble. I do not wish to be considered a chest specialist exclusively, for my interest in lung disease for twenty-five years has been to help to make lung tuberculosis a treatable disease instead of a boarding house proposition, as it was too often twenty-five years ago. In all this time, thousands of x-ray plates have passed from physicians and sanatoriums to us and from us to them, and never has this privilege of inspection or change in ownership been refused. Where a return of the films is asked, we photograph them and return them at once. In that way both records are preserved. The records of two institutions to which I am consultant include these films of photographs of original plates attached to the histories, so that on rounds the whole roentgenographic record of the case can be reviewed at once, and if it is in the patient's interest to have the original films on leaving, they are passed on.

There are a number of problems which experience has taught in the amassing of evidence that makes clear the necessity of the ownership of the original film resting in the doctor who assumes the responsibility of a therapeutic procedure that is based on the roentgen examination and which subsequent roentgenograms would not make clear. A dentist may remove a tooth at the root of which an abscess exists. The film is his justification and should be his property. A fracture may heal or not heal, and in either case there may arise questions in which he may have to defend himself, and the roentgenogram is again of fundamental importance. That this situation may be abused goes without saying, and the editorial raises properly the question of the right of others to inspect the original roentgenograms or have copies of them. And here there is need for the skilled roentgenologist, for suits are brought on the basis of such poor films that no interpretation of pathologic conditions should be made of them.

There are far too many roentgenologists, and the poorer two thirds ought to be prevented from claiming either the remuneration or the authority of the skilled ones, and this applies particularly to roentgen therapy. Most orthopedic and chest specialists, dentists and fracture specialists insist on their own reading of plates. After all, the best roentgenologists must be good clinicians and pathologists, and many that I know never lose a chance to follow a patient to surgery or autopsy in order to check up when they can, on their own observations. A good many advances in roentgenology have been due to team work between clinicians and roentgenologists. One has only to hark back to the subject of annular shadows, misinterpreted by half a dozen roentgenologists of national standing and clarified by Dr. M. P. Burnham, roentgenologist of the St. Francis Hospital, and myself:

Sampson, H. L.; Heise, F. H., and Brown, Lawrason: Pulmonary and Pleural Annular Radiographic Shadows, *Am. Rev. Tuberc.* **2**: 664 (Jan.) 1919.

Amberson, J. B., Jr.: Roentgenographic Pleural Annular Shadows in Pulmonary Tuberculosis, *Am. Rev. Tuberc.* **5**: 723 (Nov.) 1921; **6**: 480 (Aug.) 1922.

Honeij, J. A.: Cavity Formation and Annular Pleural Shadows in Pulmonary Tuberculosis, *Arch. Int. Med.* **25**: 63 (Jan.) 1920; Roentgenographic Pleural Annular Shadows in Tuberculosis, *Am. Rev. Tuberc.* **6**: 477 (Aug.) 1922.

Barlow, Nathan, and Thompson, J. C.: Small Pneumothorax in Tuberculosis, *Am. Rev. Tuberc.* **5**: 611 (Oct.) 1921.

Burnham, M. P., and Brown, P. K.: Criticism of Recent Interpretations of Annular Shadows in Lung Roentgenograms, *Am. Rev. Tuberc.* **6**: 469 (Aug.) 1922.

Brown, P. K.: Annular Shadows: Are They Cavities or Spontaneous Pneumothoraces? *Am. J. Roentgenol.* **10**: 445 (June) 1923.

In industrial hospitals, particularly such as the Southern Pacific General Hospital, where all expense is borne by an insurance rate, there is no question of the ownership of films, and yet when we discharge a patient sent in from an out of town point by any of the 450 doctors of the staff we send an interpretation of roentgenograms taken and full data concerning all laboratory work and all specialists' opinions. The films will be sent if asked for. Obviously the doctor who is to carry on should have the benefit of all facts brought out by investigations of all kinds.

There is still another angle, the value of mass evidence in certain conditions. There is no better illustration than the

figures from the Mayo Clinic on hypertrophic osteo-arthritis of the spine in some 3,000 cases over the age of 50 years in which the roentgenograms taken in the course of kidney investigations of men and women with no complaints of the spine showed that 67 per cent of the men and 40 per cent of the women had demonstrable hypertrophic changes in the vertebrae of the lumbar spine. This important study could not have been made had the Mayo Clinic not retained plates made in the course of investigation of disease conditions.

Still another problem is presented in the question of how long films should be kept by a physician or an institution. Obviously the advantage of what may be gained by mass evidence dictates the indefinite preservation of films, but unless they are carefully stored they may mildew or undergo changes that lessen their value. They have the same value that specimens have when removed at operation. A vast majority need not be kept for any purpose for more than a short period (purposely not defined). Many specimens are worthy of places in a museum and should be kept permanently. Every roentgenologist has a library of unusual cases and preserves with additional care films showing important evidence in controversial subjects.

It would seem therefore that it is the duty of some one in authority to have the courts settle all the problems connected with x-ray films of pathologic conditions for the benefit of the patient and the protection of the doctor.

PHILIP KING BROWN, M.D., San Francisco.
Supervisor of Medical Service,
Southern Pacific Hospital.

THE VOICE OF EXPERIENCE ABOUT STAIRS IN HEART DISEASE

To the Editor:—Walking downstairs is good for heart disease. Some one told me this morning about a physician who warned a man suffering from heart disease that if he walked downstairs and came up again he would drop dead. The man went back to bed with the idea of staying there! From time immemorial walking upstairs has been supposed to shorten the lives of people with heart disease. Strangely enough, few have appreciated that the reverse is true, and that going downstairs will prolong the lives of people with heart trouble.

I had under my care the late Dr. L. Duncan Bulkley, who lived to a great age (83), so that he and his father covered the entire span of skin diseases as a specialty, his father having been the first skin specialist in America. Dr. Bulkley was a really great physician, a keen observer and an original thinker. In the latter years of his life he had an office in the same office building with me. I was on the ground floor and he was high up in the building. I noticed that I often met Dr. Bulkley at the bottom of the stairs instead of coming out of the elevator. He told me that he considered walking downstairs the best exercise that he knew of and that he made it a practice to walk down instead of taking the elevator. I don't know how early in life he started the treatment but he certainly lived to a great age.

Walking downstairs is an exercise closely allied to the famous resistance exercises invented by August Schott, who was a pioneer physician of the great heart treatment center in Germany, Bad Nauheim. By some process of reasoning or accidental observation, Schott discovered that resistance movements improved the beat of impaired hearts. In this form of exercise the subject is instructed to make a movement and then the movement is gently resisted by the operator. By this means the muscles are increased as to their tonicity. It has been my belief that this tonicity of the voluntary muscles in some way or other brings about an increase in tonicity in the heart muscle.

At any rate, resistance exercises are under the control of the operator and can be used in the earlier stages of convalescence after a very serious heart attack.

Walking downstairs as an exercise for elderly persons has the additional advantage that it is an exercise also in balancing the body, a faculty that is apt to become impaired in older persons. In Europe one sees in buildings the sign "Please use the stairs in going down," but in this country stairs are used hardly at all where there are elevators, and the stairs are usually unattractive in appearance, particularly in office buildings.

Incidentally, I would remark that it has been brought to my notice that fairly young persons of the present day are often breathless after going upstairs, which was certainly not true of the same group before the invention of elevators.

LOUIS F. BISHOP, M.D., New York.

Queries and Minor Notes

ANONYMOUS COMMUNICATIONS and queries on postal cards will not be noticed. Every letter must contain the writer's name and address, but these will be omitted on request.

DIMENSIONS OF CHILD AT BIRTH

To the Editor:—At the suggestion of Dr. Ella Oppenheimer of the U. S. Department of Labor, I am writing to you for information with regard to the average dimensions of the head, hips and shoulders of a child at birth. I would appreciate any information with regard to these dimensions.

F. JOHNSTON, Newton, Mass.

ANSWER.—A recent study by Drs. Harry Bakwin and Ruth Morris Bakwin on the size of infants at birth was published in December 1934 in the *American Journal of Diseases of Children* and in *Human Biology*. The authors made many careful measurements of 1,653 new-born infants. They tabulate the average measurement of the same dimension of the infant, together with the standard deviation and the coefficient of variation. The average of their measurements of the circumference of the head in a group of 395 males was 344.90 mm., while in a group of 417 females it was 338.52 mm. In the same two groups the cephalic length (from the most prominent part of the occiput to the glabella in the midsagittal plane) was 117.21 mm. and 114.62 mm., respectively. The cephalic breadth (biparietal diameter) was 92.78 mm. and 91.87 mm., respectively. The average bi-iliac diameter in these two groups was 74.22 mm. and 71.87 mm., respectively. The biacromial diameter (straight distance between the most lateral points of the acromial eminences taken from behind with the child seated and arms close to the thorax) was 112.48 mm. and 111.30 mm., respectively. All the foregoing figures apply to the "first-born." The authors give a separate table of measurements for the "later born." They found that the external dimensions of infants at birth are larger in males than in females, and in "later born" than in "first-born" infants. They observed that new-born infants from a poverty-stricken environment were smaller in all dimensions than new-born infants from a more favorable environment. The nationality of the parents seemed to have no influence on the dimensions. The season of the year had no influence on the weight and height. A seasonal variation, however, was noted in the various dimensions, these being smaller during the spring and summer and larger during the autumn and winter.

VACCINATION AGAINST SMALLPOX

To the Editor:—Can you tell me how long after vaccination for smallpox it is before signs of immunity can be detected in the patient? Is there a definite rationale for vaccination after exposure to smallpox by the unvaccinated? Kindly omit name.

M.D., Nebraska.

ANSWER.—Practical experience is probably the best guide as to protective immunity following successful vaccination for smallpox in the unvaccinated individual. Five days after an active vaccination reaches its peak (usually about the seventh day after vaccination with potent smallpox vaccine virus) the individual is protected.

If the unvaccinated individual is exposed to smallpox and is vaccinated within four days after exposure and a prompt take results, he will in all probability escape smallpox. A successful take resulting from vaccination made from the fifth

to the seventh day after exposure will not prevent smallpox but will usually make the case mild, the lesions of smallpox will be small with a slight inflammation area about each, and the disease will run a short atypical course. Vaccination made after the seventh day following exposure will take but will not influence the severity or course of the disease.

It is wise to make a second vaccination on the person exposed less than four days, as the first vaccination may fail to take. The second vaccination should be at least 1½ inches from the site of the first vaccination and made two days after the first one.

DIFFERENTIAL DIAGNOSIS OF CONDITION AFFECTING LUNG

To the Editor:—About four months ago a man, aged 56, had an attack of influenza. He had been sick for three or four days with coughing, a cold, fever and a general malaise. He was well nourished and weighed about 160 pounds (72 Kg.). There were râles over the lower lobes of both lungs. The personal and family histories were negative. The patient was advised to rest in bed for several days, which he declined to do. Two weeks later the fever had subsided, but otherwise the condition was about the same. When he first came to the office the blood pressure registered 120 systolic, 70 diastolic; the pulse rate was full and almost bounding 72. The patient remained ambulatory for about six weeks, the condition making some improvement one week and losing it the next. Today his blood pressure is 98 systolic, 60 diastolic, the pulse rate about 90, with dulness and râles over both lungs, and hemoglobin about 65 per cent. Examinations of the sputum and the skin test are negative for tuberculosis. The patient was given digitalis and tonics the first month. Since that time he has been given a 5 cc. ampule of iron cacodylate every third day and also halibut liver oil with viosterol. For the past week he has been on the theocalcin with iodides. He feels fairly well except for a general weakness, and I notice the condition of air hunger characterized by constant effort to get a deep breath. There has been no cough for the past six or eight weeks. The patient has been in bed for the past five weeks. M.D., Alabama.

ANSWER.—It is difficult to determine from the information given whether the condition is primarily respiratory or circulatory. The term influenza is generally used loosely and it is doubtful whether the influenza bacillus alone often produces long continued pathologic changes in the lung. Bronchopneumonia complicating influenza may result in empyema, lung abscess or the activation of tuberculosis. A negative skin test for tuberculosis is not convincing. A Mantoux or Pirquet test is positive in such a high percentage of cases at this age that a negative test merely raises a suspicion of the material or the technic used. Likewise a negative sputum examination does not rule out the possibility of tuberculosis. An encapsulated, interlobar empyema is often difficult to make out and will be found only on careful roentgen examination.

The bilateral character of the lung conditions would suggest a circulatory basis for the disability. Influenza, however, is seldom primarily responsible for myocardial failure. If this patient has myocardial failure it is most likely that the myocardial damage existed prior to the influenzal attack and that the attack was merely another straw on the camel's back. The fall in blood pressure and the rapid heart rate at rest are indicative of myocardial failure, although both are consistent with infection.

The possibility of coronary thrombosis must not be overlooked. The fever, cough and general weakness of the initial attack would fit into this picture perfectly, and severe pain is not invariably a part of a coronary accident. The subsequent course in this case would fit such a diagnosis very well.

The question states that the hemoglobin is about 65 per cent at present but makes no mention of the hemoglobin percentage at the onset. The occurrence of a rapidly developing anemia would be significant.

To determine the cause of the condition, the following study is suggested:

Repeated chest examinations to determine whether the dulness is due to pleural fluid, lung consolidation or lung congestion.

A chest roentgenogram if possible, to assist in the determination.

A search for additional signs of circulatory failure, such as a swollen liver, edema of the subcutaneous tissues or albuminuria.

A careful determination of the heart size and contour, together with any additional facts regarding the preexisting state of the circulation that might be of value.

A careful examination of the urine, including simple kidney function tests. Renal failure or diabetes is not without the range of possibilities.

Lastly, but not likely, Addison's disease should be considered.

BLOOD COUNT AND BLOOD CHEMISTRY OF THE DOG

To the Editor:—Will you kindly give me information or references on (1) the normal blood count in dogs and (2) the normal blood chemistry of the dog. ISAAC APPERMAN, M.D., New York.

ANSWER.—1. The normal blood count (erythrocyte) in the dog is 6,248,666 on the basis of some nine counts by Abderhalden and others (*Arch. f. d. ges. Physiol.* **216**:362, 1927). The limits of variation were from 6,120,000 to 6,520,000. Marloff (*Arch. f. d. ges. Physiol.* **175**:355, 1919) reports a count of 6,650,000 (according to the Bürker method). These figures accord with the results of the various American investigators.

Leukocyte Count in the Dog on the Basis of the Investigations of Kuhl, Fritsch, Welsch and Werner (Man, in Comparison)

	Leukocytes 1,000 per Cu. Mm.	Kinds of Leukocytes in per Cent				
		Neutrophils	Eosinophils	Basophils	Monocytes	Lymphocytes
Man	5.50	67	3	<1	7	23
Dog	12.60	57	10	<1	8	25
Rabbit	8.91	31	2	2	1	63
Rat	6.14	17	2	<1	7	74

2. The analytic values (blood chemistry) of dog's blood are given in the following table:

Analytic Values of Dog's Blood

	In Plasma, Mg. per 100 Cc.	In Whole Blood, Mg. per 100 Cc.
Nonprotein nitrogen (as N)	22-40	35-39
Urea (as N)	15-18	17-20
Ammonia (as N)	—	<0.3
Aminonitrogen (as N)	—	3-11 depending on the state of nutrition
Uric acid	—	0.2-2.0 depending on the method
Creatine	—	0.35-2.7
Creatinine	—	1.2-1.5
Chlorine	375-404	291-334
Phosphate	3.5-4.9	—
Sodium oxide	—	365-368
Potassium oxide	—	25.8-26.0
Calcium	7-10.3	—
Magnesium	—	5.2-5.4 (?)
Cholesterol	—	92-130
Dextrose (fermentable)	—	60-100

The following additional data were obtained by L. Eichelberger:

*Analyses of Blood of Normal Dogs**

Dog	pH	Carbon Dioxide	Chloride, mM. per Kg. of Serum	Sodium, mM. per Kg. of Serum	Water, Gm. per Gm.	Total Base, Milliequivalent per Kg. of Serum	Potassium, mM. per Kg. of Serum	Nonprotein Nitrogen, Gm. per Liter	Total Proteins, Gm. per Liter	Weight of 1 Cc. of Serum
46	7.46	24.82	110.0	150.4	0.9258	158	....	....	....	1.014
47	7.43	24.80	109.6	146.7	0.9252	172	....	....	....	1.014
48	7.38	25.03	108.0	142.3	0.9261	148	....	....	....	1.014
49	7.41	23.80	109.6	139.1	0.9174	154	....	....	....	1.013
50	7.43	24.77	108.0	142.5	0.9270	151	....	....	....	1.013
51	7.42	23.20	108.0	140.0	0.9326	149	....	0.22	51.4	1.010
52	7.28	26.05	109.6	146.5	0.9196	153	....	0.28	62.7	1.015
53	7.52	28.22	107.0	141.0	0.9294	151	....	0.27	51.7	1.013
54	7.33	24.26	107.6	139.2	0.9142	147	....	0.27	62.9	1.015
55	7.36	20.96	110.4	145.7	0.9190	156	....	0.42	57.6	1.013
56	7.40	24.30	108.3	143.0	0.9166	154	....	0.40	61.7	1.012
57	7.37	21.55	109.3	136.0	0.9220	152	3.72	0.31	54.5	1.015
58	7.40	26.28	106.6	143.0	0.9160	153	3.73	0.31	63.9	1.013
59	7.44	20.84	112.5	148.3	0.9098	158	....	0.31	64.7	1.012
60	7.30	20.35	105.2	133.6	0.9284	141	3.34	0.39	56.0	1.014
61	7.37	25.47	112.1	143.1	0.9338	151	3.26	0.25	49.2	1.011
62	7.43	28.23	111.1	142.0	0.9260	153	4.10	0.29	53.3	1.013
63	7.42	26.76	110.5	147.0	0.9217	157	4.29	0.38	57.8	1.016
64	7.38	25.67	107.6	140.0	0.9197	151	4.15	0.38	57.3	1.011
65	7.46	28.30	107.9	141.8	0.9169	152	3.15	0.30	62.4	1.016

Methods: *pH*: Colorimetric: Hastings, A. B., and Sendroy, Julius, Jr., *J. Biol. Chem.* **61**: 695 (Oct.) 1924.
Carbon dioxide: Van Slyke, D. D., and Neill, J. M., *J. Biol. Chem.* **61**: 523 (Sept.) 1924.
Chloride: Van Slyke, D. D., *J. Biol. Chem.* **58**: 523 (Dec.) 1923. Wilson, D. W., and Ball, E. G., *ibid.* **79**: 221 (Sept.) 1928.
Sodium: Butler, A. M., and Tuthill, Elizabeth, *J. Biol. Chem.* **93**: 171 (Sept.) 1931.
Total base: Stadie, W. C., and Ross, Effie C., *J. Biol. Chem.* **65**: 735 (Oct.) 1925.
Protein: Kjeldahl.
Potassium: Shohl, A. T., and Bennett, Helen B., *J. Biol. Chem.* **78**: 643 (Aug.) 1928.

* Under barbital anesthesia.

SEXUAL INTERCOURSE DURING GONORRHEAL PROSTATITIS

To the Editor:—I have under my care a patient with gonorrheal prostatitis who has been receiving prostatic massage twice weekly for the past two months, following the subsidence of the acute posterior urethritis. There is no urethral discharge, and prostatic smear reveals a slowly diminishing number of pus cells. The first glass is clear and the second shows a moderate number of stringy shreds containing pus cells and a rare gonococcus. If the patient should take every precaution to protect his wife from infection, would occasional and very moderate sexual intercourse be contraindicated? The patient has a strong erotic tendency, and attempts at sublimation have been only partially successful. He resorts to masturbation once a week and has about one nocturnal emission weekly. Pelouze warns against sexual intercourse during the treatment of both chronic and acute gonorrhea. I have not noticed any harmful effects resulting from the occasional masturbation or nocturnal emission. Might not controlled sexual intercourse be just as harmless and if not what is the physiologic or pathologic basis for the prohibition? Kindly omit name.

M.D., New York.

ANSWER.—Sexual intercourse and excitement are contraindicated during a gonococcic infection. There is also some danger of infecting the partner even though strict precautions are observed. The use of sedatives (bromides and the like) are definitely indicated in those patients who are disturbed by sexual desires during the infection. Both sexual excitement and intercourse have a tendency to congest and traumatize the infected parts and are therefore contraindicated.

TREATMENT OF SYPHILIS

To the Editor:—Mrs. A. C., aged 26, married sixteen months, reported to the clinic for treatment of syphilis, Aug. 21, 1934. She stated at that time that she had a miscarriage at the sixth month in January 1934 and that the doctor in charge took a blood test in March, which was reported 4 plus. She received eleven injections of neoarsphenamine and eleven injections of a bismuth compound from this physician before reporting to the clinic. The family history was negative and blood specimens taken on the parents, sisters and brothers were negative for syphilis. The husband admitted a gonorrheal infection before marriage, which was cured, and repeated blood Wassermann tests were negative. There were no other children in the family. The patient's past history revealed only the fact that in childhood she had been treated for anemia and that the doctor gave her a series of intramuscular injections. No history of primary or secondary lesions can be obtained on repeated questionings. Examination of the patient showed a subicteric tint to the skin and sclerae. She had no complaints, she was very well nourished and developed, and all systems were negative on examination. Her blood pressure was 110 systolic, 70 diastolic. Urinalysis was negative and the blood count was essentially negative. The blood Wassermann reaction taken on admission was reported 4 plus. The reaction on the blood of the husband was negative. A spinal fluid Wassermann reaction of the patient was negative. Treatment was begun on the evidence of her blood test together with the history of the miscarriage. Since August 1934 she has received thirty injections more of neoarsphenamine 0.9 Gm. each at weekly intervals and thirty-six injections more of a bismuth compound at weekly intervals and between series of the arsenicals. Her treatment has been continuous to date but the blood Wassermann reaction has persistently remained 4 plus on all examinations. Throughout treatment the patient's physical condition has been very good. I should like to have your opinion on the following questions: 1. Is the diagnosis tenable, in the absence of clinical evidence? 2. Is this adequate treatment for the patient in view of recent researches? 3. What can I promise the patient in the way of cure if she remains under treatment? 4. Would you advise the patient to become pregnant and bear a child while under treatment? Please omit name.

M.D., New York.

ANSWER.—1. The diagnosis of syphilis is justifiable when a patient has repeatedly positive serologic tests, although no clinical signs of the disease are present. If these positive reports are obtained from different laboratories, their diagnostic value is greater. Accordingly, the diagnosis of syphilis seems warranted in the case reported.

2. The treatment to date has consisted of forty-one injections of neoarsphenamine and forty-seven injections of a bismuth compound, which is adequate treatment for the average patient with latent syphilis. The explanation for the persistently positive serologic tests in this patient should be sought elsewhere than in the inadequacy of the treatment. The spinal fluid examination was reported as negative, but no mention is made of whether search was made for evidence of cardiovascular involvement, especially early aortitis. If no aortic disease is discernible and no late mucous membrane lesions and no suggestive visceral disease can be recognized, a diagnosis of late latent syphilis is justified. The experience of the Cooperative Clinical Group in the treatment of latent syphilis has been that the continued use of bismuth compounds will usually reverse the serologic reaction to negative over a period of several years. It would seem advisable, therefore, to give the patient two courses of bismuth a year, ten or twelve injections to the course, the injections to be given at weekly intervals. The bismuth therapy should be continued for a period of three years. Frequent reexaminations should be made for evidence of cardiovascular or other visceral disease during this time.

3. The Cooperative Clinic study showed that under continued bismuth therapy 80 per cent of patients with latent syphilis become serologically negative when observed for a period of ten years. If a reexamination of the spinal fluid is again negative, it is probable that the patient will have no further trouble from the syphilis, although annual examinations should be made after the bismuth course is completed.

4. It would not seem advisable at this phase in the course of the disease to urge the patient to become pregnant. However, if she does become pregnant, it will be necessary to treat her energetically during the pregnancy. The amount of treatment a woman has received for syphilis before becoming pregnant is not an assurance that she will have a normal child. On the other hand, it has been shown that the amount of treatment she received during the first five months of the pregnancy is the important factor in keeping the child from becoming syphilitic. Accordingly, if the patient becomes pregnant, treatment with arsphenamine and bismuth compounds should be started as early in the course of the pregnancy as is possible and should be continued throughout the period of gestation.

NO PARALYSIS AFTER TOXOID

To the Editor:—In my diphtheria immunizations I have been using the one dose alum precipitated toxoid for children 6 years of age and under. Children over 6 who have a positive Schick test have been receiving the plain toxoid (William S. Merrell Company) in two doses of 1 cc. each two weeks apart. Last month a girl, aged 11 years, developed a spastic and painful paralysis of the lower extremities seven days after the second injection of toxoid. I did not see the child until she had practically recovered, since her physician was uncertain as to the diagnosis and she lived in a remote end of the country. At that time I was told that for a few days following the first dose of toxoid she had had a stiffness and soreness of the flexors of her left forearm (the arm in which the toxoid had been given). During the paralysis of the lower limbs following the second injection of toxoid the attending physician suspected and looked for signs of poliomyelitis but was unable to make such a diagnosis, since there were no other symptoms present. It seems that I have read of a case of transient paralysis following the injection of diphtheria toxoid. However, in discussing it with another physician I was ridiculed. Has such a case been reported? Will the injection of plain diphtheria toxoid cause paralysis? Is it always transient and does recovery always result? About what percentage of children over 6 have paralysis? I do not care for literature on this subject, merely your opinion.

M.D., Tennessee.

ANSWER.—Diphtheria toxoid does not produce paralysis. The unmodified diphtheria toxin may produce paralysis. The toxoid is obtained by treatment of the toxin with solution of formaldehyde. The resulting preparation is tested not only for its immunizing or antigenic value but also for toxic properties. Any preparation of diphtheria toxoid containing enough unmodified toxin to produce paralysis would not meet the requirements of the United States Public Health Service for diphtheria toxoid. The symptoms described do not correspond with those which occur in paralysis due to diphtheria. Occasionally injection of diphtheria toxoid may be followed by considerable pain in the region of certain joints, which makes the patient unwilling to move the affected parts. This condition is not infrequently described by the patient as paralysis.

BURNING OF THE TONGUE

To the Editor:—I have a patient who has been suffering from continuous "burning" of her tongue during the last five months. She states that at birth her tongue was considered unusually large and at various periods in her twenty-five years of life she has had this painful tongue. At present the tongue is large enough to fill her mouth and leave definite impressions of her teeth on the sides of the tongue. White blebs form on the borders and tip. There are deep fissures. Her teeth are in good condition; her tonsils are apparently normal except that the anterior pillars are somewhat inflamed and I have suggested tonsillectomy. She is of the so-called nervous temperament; she is at present about five months pregnant, but as this painful tongue has disturbed her at other times in the past I find it difficult to place the entire blame on her pregnancy. Kindly suggest treatment.

M.D., Kentucky.

ANSWER.—The increase in the size of the tongue, which has been present since birth, may be lymphangiomatous in character. Pregnancy may have caused a temporary increase in the lymphangiomatous tissue, which will probably gradually subside when the pregnancy is completed. On the other hand, the swelling may be neurotic in origin and controlled by conditions that are little understood.

The burning sensation is probably due to pressure. As a local treatment it might be useful to apply 2 per cent silver nitrate solution to the fissures and blebs, once a day, and use a mouth wash of three parts of Dobell's solution and one part of glycerin. Should the swelling not respond to local treatment and become so marked as to interfere with speech and swal-

lowing, some more radical measures must be used. Multiple punctures with a fine pointed cautery or the excision of a wedge shaped piece of tissue from the tip and body of the tongue followed by suture of the defect thus made might be considered. The benefit of tonsillectomy in this condition is doubtful, but it might be tried, and improvement may follow.

SENSITIVITY TO OPHTHALMIC DRUGS

To the Editor:—I should like any information you can possibly give me with regard to reactions of an allergic nature following the insertion of 1 per cent yellow mercuric oxide on the lower lids of the eye. I have a patient who, immediately following the application, developed a marked conjunctivitis with marked tearing, photophobia, and edema of the eyelids and face. Please omit name.

M.D., Chicago.

ANSWER.—The reaction here described is not at all uncommon and may be due either to yellow mercuric oxide or, what is more probable, to the petrolatum that carries the drug. It might be well to make separate patch tests on the arm of the patient with the yellow oxide and with the petrolatum. If the latter is found to be at fault, as is most likely, yellow oxide or whatever drug is to be used on the eyelids may be carried in suspension in an animal fat. If the yellow oxide is the offending agent, novoform may be substituted. Whether the reaction is allergic or otherwise is not known.

FILARIASIS

To the Editor:—I recently examined a 48 year old Negro woman whose chief complaint is intermittent, brawny, nonpitting edema of the left, and occasionally the right, leg from Poupart's ligament down. She states that this swelling first started ten years ago and that the swelling occurs only during the warm part of the year. It usually begins in May or June and disappears in September. For several days preceding the swelling there is moderately severe pain in the popliteal space, sometimes extending downward into the calf of the leg and up to the inner surface of the thigh as far as the femoral triangle. Slight pain persists in these areas after the swelling has reached its maximum. The patient has never been pregnant. Her weight is 152 pounds (69 Kg.). Physical examination and laboratory examinations have revealed the following: temperature 99.8; pulse 114; respirations 24; systolic blood pressure 155, diastolic 108; lungs normal. All the teeth are out; there is a plate above and below. The heart sounds are pounding. The nails are beaked. The mucous membranes are very pale. The left leg from Poupart's ligament down is about 25 per cent larger than the right one, which is apparently normal at this time. The leg is brawny and nonpitting after sustained pressure with one finger. The dorsalis pedis artery pulsates normally. There are a few dilated veins on the inner aspect of the left leg, 3 or 4 inches below the knee. The hemoglobin is 60 per cent; the white blood count, 9,100; the red blood count 3,350,000; the urine normal; the blood Wassermann test negative. A differential white blood count is as follows: degenerated cells 17 per cent; lymphocytes 10 per cent; polymorphonuclears 53 per cent; eosinophils 3 per cent; basophils 2 per cent; endothelial cells 15 per cent. Examination of the red cells showed poikilocytosis, anisocytosis, polychromatophilia, crenation, a few nucleated cells and a few stippled cells. I have tried repeatedly to find Filaria Bancrofti in the blood both in the daytime and at night but have found none. I would be grateful to you for any help in making a diagnosis and any suggestions as to treatment. One physician in my town who has an extensive practice states he has seen five or six of these cases in his nineteen years of practice but has never been able to diagnose the disease or help the patients in any way.

L. A. CROWELL JR., M.D., Lincolnton, N. C.

ANSWER.—While the symptoms suggest filariasis, this condition is rare in the United States except in persons from the West Indies or those who have resided in Charleston, S. C., where there is a focus of infection. The absence of microfilariae in the blood does not contraindicate filariasis. As the edema is nonpitting and is mainly unilateral, the possibility of malaria or ancylostomiasis as causal agents is unlikely. If Milroy's disease and abdominal tuberculosis are excluded it is probable that the patient's condition is filarial and it would be well to treat her by roentgen therapy, the technic of which is given by Golden, Ross and O'Connor, F. W.: The Roentgen Treatment of Filariasis, *Tr. Roy. Soc. Trop. Med. & Hyg.* **27**:385, 1934.

CORNEAL DYSTROPHY

To the Editor:—I have a patient suffering from dystrophy of the cornea and I am anxious to find a remedy. The diagnosis was made by one of the most prominent men in the profession, but he knew of nothing that would help. Please omit name.

M.D., Mississippi.

ANSWER.—There are various types of corneal dystrophy. The treatment in all of them is without good results. The form known as Salzmann's nodular corneal dystrophy can be helped; that is, the vision may be improved by the surgical removal of the nodules. In the *Archives of Ophthalmology* (**13**:598 [April] 1935) Katz and Brown described the nature of this condition and recommended the surgical removal. They had a good result in their case.

SYRUP CERASIAE

To the Editor:—Will you please send me the formula for syrup cerasiae, which, I understand, will be official in the next Pharmacopeia?

PERRY B. PRESTON, M.D., Newark, N. J.

ANSWER.—The following formula for Syrup of Cherry will be official in N. F. VI:

SYRUPUS CERASI; SYRUP OF CHERRY; SYR. CERAS.

Crush sour cherries (not pitted) in a grinder, dissolve 0.1 per cent benzoic acid in the mixture, and allow to stand at room temperature until a small portion of the filtered juice produces a clear solution when mixed with one half of its volume of alcohol. Press out the juice from this mixture and filter; add sucrose in the proportion of 850 Gm. of sucrose to each 450 cc. of the filtered juice. Dissolve the sucrose in the juice by heat on a water bath, cool, and remove the scum. Add 20 cc. of alcohol for each 1,000 cc. of syrup.

Storage: Keep the syrup in well closed containers.

USE OF OSCILLOGRAPHS

To the Editor:—I should like to know whether the instrument known as the oscillograph (recording type) has ever been used medically. By medically I mean the recording of cardiac murmurs, thyroid and intracranial bruits, or other audible sounds coming from the body. With a very sensitive type of instrument it seems to me that there are possibilities with it worth investigating.

KENNETH H. ABBOTT (intern), San Bernardino, Calif.

ANSWER.—The correspondent is not specific with regard to the type of recording oscillograph he had in mind. There are the mechanical types of oscillograph, such as the sphygmo-oscillograph and the Tycos recording oscillometer. There are electrical oscillographs, such as the types used in the amplifying electrocardiograph and the cathode ray oscillograph. The mechanical types of oscillographs are obviously not sensitive enough or suited to the study of cardiac murmurs. The electrical types of oscillographs have been used for this purpose. Information on this subject is given by Johnston, F. D.: The Value of Sound Records in the Diagnosis of Mitral Stenosis (*Am. Heart J.* **10**:654 [June] 1935).

CHANCROID ANTIGEN

To the Editor:—What information have you with regard to a chancroid antigen for diagnosis and treatment? Is it available commercially? Please omit name.

M.D., Minnesota.

ANSWER.—A chancroid antigen for diagnosis and treatment known as dmelcos vaccine is stocked by Poulenc Frères, 507 Fortune Street, Montreal, Canada. Because of United States laws it is impossible to procure it in this country. Sterilized pus from chancroidal buboes may also be used as a diagnostic antigen. The whole subject, together with a discussion of the preparation of antigen, was reported by Cole and Levin in THE JOURNAL, Dec. 21, 1935, page 2040.

TONSILLECTOMY IN A PATIENT WITH HEMOPHILIA

To the Editor:—In Queries and Minor Notes in THE JOURNAL, January 4, the answer to a question on tonsillectomy in a patient with hemophilia is rather incomplete.

A study of the bleeding and clotting time of a patient with hemophilia is nonpredictive of postoperative bleeding. The bleeding time is always normal. The clotting time may or may not be elevated during episodes of continuous oozing. The determining factor in the blood of a patient with hemophilia is not the clotting time but rather the platelet lysis value. The platelets may be perfectly normal, in fact elevated, but the failure of half the platelets to agglutinate within an hour is prognostic of postoperative bleeding.

I have never been able to shorten materially the clotting time in a patient with hemophilia by the injection of serum. The most effective procedure for tonsillectomy in such a patient, whatever his clotting time may be, is a large transfusion immediately before operation. Surgical trauma to mucous membranes produces more marked oozing than that following skin incisions. Therefore on the slightest indication of oozing postoperatively, usually on the third or fourth day in operations involving the mucous membranes, a second large transfusion is indicated. The local bleeding can be arrested by packs moistened with powdered brain and epinephrine solution. But no pack should be applied until the soft clot is completely removed each time. Once major bleeding has been arrested by packing, the gauze is removed and freshly cut strips of meat are applied to the surface of the wound and held there as long as possible. Local hemostatics other than fresh meat, fresh blood or freshly prepared human serum are useless for the arrest of true hemophiliac bleeding. Tonsillectomy in a patient with hemophilia is less troublesome by surgery than by electrical coagulation, for clean cut wounds ooze less and for a shorter period of time than do ragged wounds. Electrical coagulation in a true subject of hemophilia produces no bleeding during the procedure, but secondary hemorrhage follows several days later when the coagulated tissue is displaced in the healing of the mucous membrane.

I. NEWTON KUGELMASS, M.D., New York.

Council on Medical Education and Hospitals

THE RECENT GRADUATE AND DRUG NIHILISM

NORMAN A. DAVID, M.D.
Assistant Professor of Pharmacology, University of Cincinnati College of Medicine
CINCINNATI

Modern medicine firmly acknowledges the fundamental rôle played by drug therapy in the rational treatment of disease. Through centuries of experience and observation the physician has learned the value of drugs, and, although he realizes that there are certain limitations to their use, considerable faith is placed in those preparations known to be reliable. The drugs described in the Pharmacopeia, the National Formulary and New and Nonofficial Remedies provide a wide variety of proved and dependable agents from which an adequate armamentarium can be selected. These drugs should be wholly suitable for all the physician's medical needs, and good therapeutics demands that they be used and prescribed whenever it seems desirable to do so.

Today, however, among many practitioners, and especially those who have recently graduated, there is a growing tendency to ignore the established principles of drug therapy and to minimize the value of standard remedies in modern practice. Judging from the restricted use now made of pharmacopeial preparations, it would appear that a wave of drug nihilism is sweeping over the profession and engulfing many members. It seems that these individuals, appropriately called "nihilists," employ few reliable drugs, show but little skill in selecting those they do use, and usually prescribe insufficient quantities to permit adequate treatment. Either they are unwilling or, what is more likely, they do not know how to use more than a limited number of the very simplest preparations.

Unfortunately, their practice of nihilism does not apply to the proprietary drugs, good or bad, which are given with little hesitancy. These compounds can be prescribed quickly by simply jotting down some easily remembered trade-name. For the "nihilist" to devote a minute or two to writing a suitable prescription seems to be impracticable, since he believes it matters little what medication is given anyway. Usually the "nihilist" tries to avoid writing a prescription. Should the patient suggest that some remedy be prescribed, the doctor readily complies by giving the first preparation he thinks of—unless this effort can be saved by merely handing the patient a sample bottle of some new proprietary. With this type of physician in our midst, is it surprising that drug therapy and prescription writing are rapidly becoming lost arts?

EVIDENCES OF DRUG NIHILISM

For some time the pharmacists have been aware that very few pharmacopeial preparations are being prescribed. While, now and then, they make feeble attempts to heed the suggestions offered by trade journals to improve the turnover of standard drugs, their main interest is in the more profitable proprietaries. These fast-selling compounds now occupy the conspicuous and handier places on the shelves, while the galenicals have been relegated to the back rooms and basement. Few pharmacies can be found today which are exclusively devoted to the compounding of prescriptions, and none without an abundance of proprietary remedies.

The pharmacist's prescription file also contains interesting information. A search through the current prescriptions written by both the older and the younger practitioners will show that the younger man, who often is the busier, rarely writes an order for drugs, and when he does he invariably calls for proprietaries. This was shown to be true some years ago and is even more evident today. In 1930 Dr. Walter Cree[1] examined the prescription files of several drug stores in Detroit and found that 54 per cent called for pharmacopeial drugs, 17 per cent for a mixture of standard remedies and proprietaries, and 29 per cent for proprietary remedies alone. He noted that prescriptions in the first group were written mainly by older physicians and those in the last two groups almost entirely by the more recent graduates. Commenting on these observations, Dr. Cree aptly remarks that "the younger physician has drifted into the habit of using proprietary preparations to save time or has been guided by ostentatious advertising." Dr. Cree's contention is supported by the statements of several other writers,[2] who have similarly called attention to the recent graduate's shortcomings in drug therapy as well as the increased use of proprietaries in the profession.

A justifiable nihilism developed in modern times through the influence of Osler (1849-1919), who neglected therapeutics to emphasize diagnosis. This nihilism was helpful in discarding many useless polypharmacal preparations and in focusing attention on the experimental evidence for the action of pure chemicals. Other than hearsay there are little data to show to what extent nihilism is now practiced. Since few physicians take up the practice of nihilism intentionally but seem rather to have fallen into this habit through inability to employ drugs with success, perhaps the true reason for their nihilism can be traced to inadequate knowledge of drug therapy. This leads to a consideration of the results shown by state medical examining boards. If the graduates of today show little interest in drug therapy and appear to be doing poorly in the subjects of pharmacology, materia medica and therapeutics, it can hardly be expected that in their practice they will experience much success with the use of drugs. Those who are fortunate in having large practices will resort to the use of makeshift proprietaries, and those with few patients will soon forget what little they know of drug therapy and prescription writing. It appears, therefore, that much can be learned concerning not only the extent of nihilism but also its present increase, if some reliable information as to the recent graduate's knowledge of drug therapy is at hand.

CRITICISMS OF MEDICAL EXAMINERS

A logical source for such information was suggested by a circular letter sent to the deans of various medical schools in August 1934 by Dr. Felix J. Underwood, executive officer of the Mississippi State Board of Health. In this letter, which substantiated the annoying rumors I had heard at recent medical meetings, the following significant statement was made:

> "For several years the grades in materia medica and pharmacology have been uniformly low. Because of the particularly low grades made this year in this subject, it was recommended by the examiner in that subject that all medical schools whose graduates are eligible for examination by this board be notified of the findings of the board and requested to make efforts to improve or increase teaching on this subject. *This is particularly necessary now when there is so much medical nihilism.*" (Author's italics.)

In view of this criticism, it appeared that reports from other state medical boards would be instructive and would provide data from which some general conclusions could be drawn. Consequently, in January 1935, questionnaires were sent to all secretaries of state medical examining boards in this country asking their opinions of the knowledge and training recent graduates had in pharmacology, materia medica and therapeu-

From the Departments of Pharmacology, University of Cincinnati College of Medicine, Cincinnati, and the University of West Virginia School of Medicine, Morgantown, W. Va. The author received assistance from Mr. Eli A. Rosen in compiling data and helpful criticisms from Dr. Chauncey D. Leake.

1. Cree, W. J.: Is the Writing of Prescriptions Becoming a Lost Art? J. Michigan M. Soc. **29**: 901-903 (Dec.) 1930.
2. LaWall, C. H.: Cooperation Between Physician and Pharmacist, Am. J. Pharmacy **104**: 48-53 (Jan.) 1932. Irons, E. E.: Selection of Proprietary versus Nonproprietary Drugs in Hospital Prescribing, J. A. M. A. **94**: 1277-1279 (April 26) 1930.

tics. They were asked to base their statements as much as possible on the examination results of the past few years, as well as the impression of the board's examiner in that subject of the recent graduate's knowledge of drugs and drug therapy as compared to the graduate of some years ago. In addition, these secretaries were asked to furnish on a chart the subject averages for each examination held during the past several years. Averages were requested for each subject of the ten to fifteen in which most boards hold written examinations, and for each group examined during the period reported. These facts would readily allow comparison to be made between the grades for pharmacology and other subjects.

Practically every state secretary answered and voiced some opinion about the teaching of pharmacology, although suitable statistics could be secured from only twenty states. While nine state secretaries reported that they could find no fault with respect to this subject, a larger number registered complaints that the graduates of today know little about drugs and less about their use. Some of the answers received show that all

Partial Subject Averages for Twenty State Medical Board Examinations During 1930 to 1935

State	Examinations Held from	Number of Examinations	Number of Examinees	Subject Average: Pharmacology, Materia Medica, Therapeutics	Anatomy and Histology	Physiology	Chemistry	Bacteriology	Pathology	Hygiene	Medicine	Physical Diagnosis	Obstetrics	Gynecology	Surgery	Pediatrics	Specialties	Medical Jurisprudence	General Average for State
Idaho	Oct. 1932 to Oct. 1934	4	23	80	85	91	85	86	78	..	84	..	88	89	88	82	..	..	86.1
Illinois	Jan. 1933 to Oct. 1934	8	455	85	79	78	78	77	77	79	..	87	79	79	82	87	88	79	82.1
Iowa	June 1932	1	108	86	84	88	87	..	86	..	86	..	90	..	87	..	..	..	86.7
Kentucky	June 1932 to June 1934	3	211	*78	80	84	85	84	87	79	..	82	91	91	82	..	82	..	83.2
Louisiana	June and Dec. 1933	2	119	*87	86	84	89	73	73	86	78	78	83	78	78	..	..	..	81.1
Minnesota	Jan. 1932 to Oct. 1934	12	428	86	..	..	..	..	..	..	91	96	88	88	88	86	87	..	88.9
Mississippi	1930 to 1934	5	241	79	81	83	84	87	84	88	85	78	84	84	85	..	85	..	83.6
Missouri	1932 to 1934	3	571	*82	80	85	82	86	85	87	84	..	86	82	84	87	82	84	84.1
Montana	1932 to 1935	4	29	79	80	82	..	..	..	..	84	..	84	81	85	81	81	..	81.8
Nevada	1932 to 1934	5	13	81	77	73	69	79	78	..	78	78	79	79	83	..	..	..	77.6
New Jersey	June and Oct. 1934	2	185	*69	79	82	69	83	..	78	80	80	80	80	76	..	..	..	79.8
North Dakota	1932 to 1934	3	50	*76	77	77	80	81	82	82	79	79	82	82	79	82	80	..	79.4
Ohio	Dec. 1931 to June 1935	8	1,132	*84	74	84	75	..	83	..	84	76	86	..	74	..	71	..	79.1
Oklahoma	1932 to 1935	4	250	80	79	90	87	87	90	..	91	..	89	87	89	..	..	85	85.9
Pennsylvania	1930 to 1935	9	2,192	*81	76	85	83	85	85	81	81	81	83	83	76	..	81	81	81.5
Vermont	1934 to 1935	4	55	83	84	86	86	82	77	84	79	..	89	87	86	..	..	84	84.3
Virginia	June 1934	1	127	80	80	..	77	85	85	91	91	87	82	82	91	..	85	83.0
Washington	1933 to 1935	3	104	*80	73	83	85	77	85	84	81	81	82	82	82	..	..	..	81.5
West Virginia	1932 to 1934	9	85	*88	83	87	86	86	83	86	84	87	90	90	86	87	..	86	85.1
Wyoming	1933 to 1935	4	5	80	79	87	72	83	84	85	85	74	83	83	85	..	..	..	81.2
Total		93	6,383																
General average				81.20	79.78	83.83	81.05	82.56	82.4	83.4	83.6	82	85.1	83.7	82.8	85.3	81.9	83.4	82.80

is not well with respect to the younger physician's knowledge of therapeutics. To illustrate this point, several of the more emphatic replies are presented, in part:

"The Indiana board, at its January 1935 meeting, expressed disapproval of the grades in these subjects and raised the passing grade from sixty to seventy-five, on account of the consistently low grades in the past few years." (Dr. William R. Davidson, secretary of the Indiana State Medical Board.)

"Some years ago we did have difficulty in having students realize that they were supposed to get patients well, and no matter how erudite they might be in anatomy, pathology or diagnosis, after all the sick person presents himself for one purpose only and that is to get well. We were amazed to find the rather elementary knowledge some excellent students had regarding materia medica and pharmacology. This was taken up with the Illinois schools at that time and the condition has been greatly improved." (Dr. J. R. Neal, secretary of the Illinois State Medical Board.)

"We have to regret that the doctors now being graduated know so little about galenical preparations and we find too many, from our way of thinking, prescribing proprietaries and synthetic preparations. I have become cognizant of this fact as all my professional life I have been connected with a pharmacy which I now own. The larger number of prescriptions coming to us now are for the so-called medicines just mentioned." (Dr. W. Scott Nay, secretary of the Vermont State Medical Board.)

"I do know that the grades on materia medica have been below average for the past ten years. I contribute this to the fact that the men who are teaching this subject in the medical schools are not physicians engaged in active practice in medicine." (Dr. H. W. Qualls, secretary of the Tennessee State Medical Board.)

"The manufacturing chemists and pharmacists are now providing the materia medica and the pharmacology for the medical profession. The graduates of today know nothing about the finer differentiations of drugs and very little of their proved physiological effects or symptomatology. Hence a diuretic is a diuretic without individual characteristics or differentiations." (Dr. T. J. Crowe, secretary of the Texas State Medical Board.)

MEDICAL BOARD AVERAGES

Twenty states supplied examination averages for one or more years during the period 1930 to 1935. While these states represent a fair cross-section of the country, it is to be regretted that more could not cooperate in this study. Some of the larger states explained that, since they kept only individual records and examined many graduates each year, they had neither the time nor clerical assistance necessary to compile the subject averages requested. Others[3] reported that since they do not examine specifically in pharmacology, materia medica and therapeutics, although questions on these subjects are included under other titles, they could furnish no data of comparative value. No answers were received from eight states.[4]

Judging from the difficulty encountered in accumulating the incomplete data offered here, it appears that few states take the trouble to compile subject averages or arrange their examination results in a satisfactory statistical manner. If such data could be obtained and organized statistically by some central bureau, perhaps one maintained by the Council on Medical Education and Hospitals of the American Medical Association, the information gathered would prove of great value. It would then be possible not only to note at once where and when graduates were doing badly in some study but also, through this bureau, to work for standardization and unification of the various methods now employed by the state medical boards. Even with the small number of twenty states reported, marked lack of uniformity was noted in the subjects of examinations.

The accompanying table shows the months or the years in which the examinations were held by the states furnishing data, the number of examinations held, the number of examinees, and the general averages made in each respective subject given as well as the general average for each state in all subjects during the period indicated. In the table the asterisk preceding the averages denotes that these figures have been compiled from an average of the highest six and the lowest six grades made in each subject. While this does not give an exact

3. Alabama, Arizona, Colorado, Massachusetts, New Hampshire, Texas and the District of Columbia.

4. Delaware, Florida, Georgia, Oregon, Rhode Island, South Carolina, South Dakota and Utah.

average for each subject, it is sufficiently accurate for comparative purposes and varies only slightly from the true result. Further inspection will show that some states omit examinations in certain major subjects and that only a few conduct separate examinations in the subjects of pediatrics, medical jurisprudence, and the specialties such as ear, eye, nose and throat, and urology. In some states, such as Connecticut and Minnesota, examination in the fundamental subjects comprising the first two years of the medical curriculum are conducted by basic science boards, which examine the student when he has completed this much work. Had averages for these subjects been included with those of the clinical years shown for Minnesota, perhaps the general average for this state would not have been so high.

More than 6,000 examinees are reported. The general average made in the fifteen major subjects listed was 82.8 per cent. The general average of 81.2 per cent for pharmacology, materia medica and therapeutics is the third lowest given, the lowest average being made in anatomy and histology and the next lowest in chemistry and biochemistry. Four other subjects were below average, while those which were above do not appear very much higher than the general average for all subjects. It is interesting to note, in view of recent widespread criticism of our present-day knowledge and practice of obstetrics, that in this survey this subject showed, next to pediatrics, the highest average—suggesting that our graduates are well versed in theory if not in practice.

An inspection of the results given for individual states shows that Minnesota reported the highest general average of 88.9 per cent and Nevada, with only few examinees, the lowest of 77.6 per cent. The lowest figure given for any subject is 69 per cent, which was the average for pharmacology and also biochemistry in New Jersey and for biochemistry in Nevada. When the subject averages of each state are compared, it will be seen that the results shown for pharmacology are the lowest of all for the states of Kentucky, Montana and North Dakota and as low as or higher than only one other subject in New Jersey, Mississippi, Oklahoma, Minnesota and Idaho. While similar observations may be made, perhaps, for the two other low subjects, it is apparent that pharmacology deserves its place as thirteenth on the list of subjects reported here.

Sets of questions on pharmacology, materia medica and therapeutics for examination held during the period reported on were obtained from most of these states. A study of these questions shows that while some variation exists, of course, none are especially difficult. The majority are of the general type that should be easily answered, provided the student has a fair knowledge of the subject.

The purpose of this brief survey has been to present definite evidence to the medical profession that our recent graduates know little about the use of drugs when they begin the practice of medicine. The statistics serve to substantiate the current rumors frequently heard about the shortcomings of our younger physicians. While considerations for improving this serious situation are the immediate concern of the teaching profession, a plea is made to the practicing physician to endeavor to do what he can to keep out of the ranks of nihilism and improve his own selection and utilization of drugs. The practitioner can accomplish this by giving more attention to discussions on desirable drug therapy and proved newly introduced remedies that appear regularly in ethical medical journals, and less to the self-praising advertisements that fill uncritical medical publications. To his surprise, the physician will often find that, if he reviews standard textbooks on drugs and therapeutics, much worth while information is offered, a great deal of which may have been previously overlooked. As for prescriptions, it matters little whether they are written in metric or apothecary systems, if the drugs prescribed can be depended on to do what is desired of them.

Eden and Bethesda avenues.

Medical Examinations and Licensure

COMING EXAMINATIONS

ALASKA: Juneau, March 3. Sec., Dr. W. W. Council, Juneau.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Written examination for Group B applicants* will be held in various cities throughout the country, March 14. *Oral examination for Group A and B applicants* will be held in Kansas City, Mo., May 11-12. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Written examination and review of case histories of Group B applicants will be held in various cities of the United States and Canada, March 28. *Applications must be filed not later than February 28.* Oral, clinical and pathological examination of all candidates will be held in Kansas City, Mo., May 11-12. *Applications must be received not later than April 1.* Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh (6).

AMERICAN BOARD OF OPHTHALMOLOGY: Kansas City, Mo., May 11 and New York, Oct. *All applications and case reports must be filed sixty days before date of examination.* Asst. Sec., Dr. Thomas D. Allen, 122 S. Michigan Ave., Chicago.

AMERICAN BOARD OF ORTHOPEDIC SURGERY: Kansas City, Mo., May. *Applications should be filed with the secretary before April 15.* Sec., Dr. Fremont A. Chandler, 180 N. Michigan Ave., Chicago.

AMERICAN BOARD OF OTOLARYNGOLOGY: Kansas City, Mo., May 9. Sec., Dr. W. P. Wherry, 1500 Medical Arts Bldg., Omaha.

AMERICAN BOARD OF PEDIATRICS: Kansas City, Mo., May 9. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: St. Louis, Mo., May 8-9. Sec., Dr. Walter Freeman, 1028 Connecticut Ave., Washington, D. C.

AMERICAN BOARD OF RADIOLOGY: Kansas City, Mo., May 8-10. Sec., Dr. B. R. Kirklin, Mayo Clinic, Rochester, Minn.

CALIFORNIA: Los Angeles, March 9-12. *Reciprocity.* Los Angeles, March 18. Sec., Dr. Charles B. Pinkham, 420 State Office Bldg., Sacramento.

CONNECTICUT: *Basic Science.* New Haven, Feb. 8. *Prerequisite to license examination.* Address State Board of Healing Arts, 1895 Yale Station, New Haven. *Medical (Regular).* Hartford, March 10-11. *Endorsement.* Hartford, March 24. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Medical (Homeopathic).* Derby, March 10. Sec., Dr. J. H. Evans, 1488 Chapel St., New Haven.

IOWA: Des Moines, Feb. 25-27. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MAINE: Portland, March 10-11. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MASSACHUSETTS: Boston, March 10-12. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413 State House, Boston.

NATIONAL BOARD OF MEDICAL EXAMINERS. *Parts I and II.* Feb. 12-14, May 6-8, June 22-24, and Sept. 14-16. Ex Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

NEVADA: *Reciprocity.* Carson City, Feb. 3. Sec., Dr. Edward E. Hamer, Carson City.

NEW HAMPSHIRE: Concord, March 12-13. Sec., Board of Registration in Medicine, Dr. Charles Duncan, State House, Concord.

OREGON: *Basic Science.* Portland, March 21. Sec., Mr. Charles D. Byrne, University of Oregon, Eugene.

PUERTO RICO: San Juan, March 3. Sec., Dr. O. Costa Mandry, Box 536, San Juan.

VERMONT: Burlington, Feb. 11-13. Sec., Board of Medical Registration, Dr. W. Scott Nay, Underhill.

WEST VIRGINIA: Charleston, March 16. State Health Commissioner, Dr. Arthur E. McClue, Charleston.

WYOMING: Cheyenne, Feb. 10-11. Sec., Dr. G. M. Anderson, Capitol Bldg., Cheyenne.

Maryland (Homeopathic) December Report

Dr. John A. Evans, secretary, Board of (Homeopathic) Medical Examiners, reports the written examination held at Baltimore, Dec. 10-11, 1935. The examination covered 9 subjects and included 70 questions. An average of 70 per cent was required to pass. Two candidates were examined, both of whom passed. One physician was licensed by reciprocity, September 30. The following school was represented:

School	PASSED	Year Grad.	Per Cent.
Hahnemann Medical Col. and Hospital of Philadelphia		(1935)	84, 86

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Hahnemann Medical Col. and Hospital of Philadelphia		(1907)	Penna.

Alabama Reciprocity Report

Dr. J. N. Baker, secretary, Alabama State Board of Medical Examiners, reports 16 physicians licensed by reciprocity from July 3 through Nov. 25, 1935. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Northwestern University Medical School		(1934)	Michigan
University of Louisville School of Medicine		(1929), (1932)	Kentucky,
		(1932)	Missouri
Louisiana State University Medical Center		(1935)	Louisiana
Tulane University of Louisiana School of Medicine		(1931), (1933), (1934)	Louisiana
Washington University School of Medicine		(1932)	Missouri
Medical College of the State of South Carolina		(1929)	Georgia
Meharry Medical College		(1934)	Tennessee
University of Tennessee College of Medicine		(1934, 2)	Tennessee
Vanderbilt University School of Medicine		(1934, 2)	Tennessee
Medical College of Virginia		(1933)	Virginia

Book Notices

Injury and Incapacity with Special Reference to Industrial Insurance. By H. Ernest Griffiths, M.S., F.R.C.S., Surgeon, Albert Dock Hospital, London. Cloth. Price, $5. Pp. 270. Baltimore: William Wood & Company, 1935.

As a basis for this book, it was thought necessary to investigate a large number (50,000) of histories of accidents and to trace them from the date of injury to the time of resumption of full work. This investigation was required on account of the differences of opinion expressed by medical witnesses when asked at law courts to give a prognosis in cases of injury. The hospital surgeons generally give a much more favorable prognosis than the panel doctor (general practitioner), because the surgeon bases his prognosis on the length of time before the man will be discharged from treatment and the panel doctor on the length of time for which he will have to give certificates before the man ultimately resumes his work. One large insurance company anonymously opened its books for the purpose of this author's statistical study. The first part of the book describes disabilities following injuries of the head, chest, back and abdomen; fractures of the upper and lower limbs; nerves, muscles and tendons; dislocations and diseases of joints of the upper and lower limbs; amputations, and miscellaneous injuries. Tables for periods of disability from light and heavy work and for different ages are given. The language used is not highly technical and impresses one as being directed much more to the lay than to the medical man. The second part of the volume discusses the various types of workers, so that the reader may have an accurate knowledge of the physical requirements of the workmen engaged in the specific job under consideration, and lists the incapacities arising from definite injury or loss. In this part there is much repetition, which might have been condensed into reference tables. An interesting and helpful index of occupations is given to fit each trade or employment into the list of twenty-four principal types, which are described in detail. The American reader may be a little confused to find burr takers out (wool combing), barfillers (hosiery), can dodgers, chasers, cheese winders, daubers (coke and by-products), fitment polishers, greasy birlers, gulley cleaners, monocasters, raisers (pen making), sole examiners, throstle piecers, willeyers and washers; so many of these trades have been lost in the mechanization of American labor.

Comparative Psychology: A Comprehensive Treatise. Volume I: Principles and Methods. By Carl J. Warden, Ph.D., Assistant Professor of Psychology, Columbia University, Thomas N. Jenkins, Ph.D., Assistant Professor of Psychology, New York University, and Lucien H. Warner, Ph.D., Research Associate, Department of Zoölogy, Pomona College. Psychology Series. Edited by Albert T. Poffenberger, Ph.D., Professor of Psychology, Columbia University. Cloth. Price, $4.50. Pp. 506, with 141 illustrations. New York: Ronald Press Company, 1935.

This is the first volume of a massive three volume, comprehensive treatise on which these authors have been working for more than a decade. Their attitude is that comparative psychology is a biologic science rather than a form of philosophy and they have tried to keep their whole study on a basis of experimental procedures rather than speculation. On the completion of the series it will be found that the subject of comparative psychology has been comprehensively covered and that it has been done in a systematic way, closely allied to the method of the zoologists, in that the traits and psychologic characteristics of the various biologic groups are considered, with the evolutionary tree being kept strongly in mind. The present volume is largely one dealing with the technics used today in studying comparative psychology. There is a chapter giving the historical development of the science of comparative psychology in considerable detail. Succeeding chapters discuss the point of view and the biologic foundation of comparative psychology. There is a brief chapter dealing with the classification and analysis of animal behavior. The succeeding two chapters form at least a third of the book. In the first of them, methods are outlined in detail showing apparatus, equipment and technics of testing receptive capacity; and, since tests of receptive capacity to some extent delineate reactive capacity, the chapter on receptive capacities is followed by one describing means of testing reactive capacity. Mazes, problem solving apparatus, selection boxes, discrimination apparatus and other equipment devised by comparative psychologists are discussed in considerable detail and are illustrated by drawings and reproductions of photographs. The present volume closes with a long discussion of morphology and to some extent of the physiology of the various animal forms, particular stress being placed on the nervous system and effective capacity. There is an extensive bibliography, and the literature seems to have been carefully covered. A knowledge of comparative psychology and its methods should be of great aid to physiologists and psychologists, but so far as the present volume is concerned it is difficult to see how it would help the physician or the psychiatrist. The latter, however, will no doubt find much of value in the succeeding volumes; hence a knowledge of what is in the present one will make a study of those volumes easier. One can commend these authors on their careful, painstaking work and emphasize the fact that comparative psychology will undoubtedly at some time have a relationship to psychiatry and neurology somewhat similar to that of animal experimental physiology and medicine.

Manuali pratici di medicina biopsicologica. N. 7: La nuova eugenica. Del Prof. Dott. Casimiro Frank, docente di neuropatologia nella r. Università di Roma. Paper. Price, 9 lire. Pp. 129, with 1 illustration. Rome: Edoardo Tinto, 1935.

L'immunità acquisita mediante l'educazione psichica integrale. Del Prof. Dott. Casimiro Frank, docente di neuropatologia nella r. Università di Roma. N. 11, Manuali pratici di medicina biopsicologica. Paper. Price 6 lire. Pp. 119. Rome: Edoardo Tinto, 1935.

Dr. Frank is one of the leading neurologists in Rome. Until somewhat recently he has been primarily interested in neuroanatomy and neuropathology, but the present two brochures are two parts of a series of twelve volumes intended to delineate his theory of biopsychology. Briefly stated, this theory is based on the author's observation that there are differences in cortical development in the sound and in the unsound mind. He links up as a background for his theory many of the more modern but seemingly unrelated observations such as those of von Economo regarding the cyto-architectonics of the central nervous system and the mnemic psychology of Semon. He also stresses radioactive processes of the cerebrum, which he considers to be of great importance. The first volume, dealing with the "new eugenics," is really a critical analysis of the various types of Darwinian and Lamarckian evolutionary theory. He presents these at some length, after which he discusses his own biopsychologic doctrine, pointing out that he has developed a new natural philosophy based on the various cerebral association processes. Following this he discusses the criticisms of the Darwin theory, bringing in the ideas of such discredited critics as George Bernard Shaw. He concludes this volume with a discussion of the problems that are brought up by his new biologic philosophy. Many of the factors are in disagreement with our American ideas; for instance, he asserts that delinquency is due to aplasia of the frontal lobes.

The second pamphlet is a rather general discussion of the author's theory of immunity. He thinks that the development of the cerebrum has a great deal to do with the acquisition of immunity and he discusses at some length the difference between the older psychiatric theories and his newer theory, in which such accepted technics as psychoanalysis and hypnosis are rather cavalierly handled. He feels that there are technics of building up the nervous system so that both organic and functional nervous disorders as well as parasite infection and tumor growth can be prevented. The present handbooks, while complete in themselves, are hard for the reader to grasp, because they presume a knowledge of Dr. Frank's earlier works and of the other pamphlets in the series, some of which have not yet been published. In one or two chapters in each brochure he gives a brief and rather ingenious description of his theory but one insufficient for full comprehension. Also in the volume in which he discusses acquiring immunity one does not get a clear picture of how he is going to bring this about. It is quite possible that, after all the volumes of the series have appeared, much will be found that is interesting and valuable in the theory.

In volume 7 there is a short glossary of terms that one might find helpful, for the author uses many neologisms (making his writings more difficult for the American reader), and at the

end of that volume is an interesting graph showing the processes of consciousness in health and in disease. The classification that he gives on this graph does not agree with the Anglo-Saxon conception of psychopathology. It will probably be several years before the significance of Frank's work will be clear, but those who are able to read Italian should find much of interest in his rather novel and ingenious ideas.

Nervous and Mental Diseases: A Simplified and Comprehensive Presentation of Nervous Diseases and Insanity. By Bernard S. Maloy, M.D. With an introduction by John H. Wigmore, A.M., LL.B., LL.D. Fabrikold. Price, $7.50. Pp. 551, with 40 illustrations. Indianapolis: Bobbs-Merrill Company, 1935.

This carelessly compiled volume is intended to be of service to lawyers engaged in medicolegal work and for busy doctors who have not the time to survey the details of the field of neurology and psychiatry. There is no indication that the author's own experience in the field enables him to perform that most difficult task of abstracting the more important facts for general practitioners and lawyers. His material is entirely culled from other books and his illustrations are borrowed. Much of the material has been given in abstracted form for the sake of brevity and the errors are too numerous to mention. The work is not recommended to the legal profession or to the practitioners of medicine.

Angines lympho-monocytaires, agranulocytoses, leucémies leucopéniques. Par le Professeur Jean Sabrazès, médecin des hôpitaux de Bordeaux, et René Saric, interne des hôpitaux de Bordeaux. Paper. Price, 40 francs. Pp. 363, with 18 illustrations. Paris: Masson & Cie, 1935.

This is a unique monograph dealing with current hematologic enigmas. During the past five years, however, a great deal of clinical interest has been evinced by physicians in this country over agranulocytosis. This subject is generously discussed, being given about half of the space. The authors discuss the clinical, hematologic and pathologic manifestations in infectious mononucleosis, agranulocytosis and subleukemia and in aleukemic lymphadenosis and myelosis. Treatment is considered in detail, but it is doubtful whether anything of a fundamental character has been contributed. The prevailing information, both American and European, is well covered, however. Besides reviewing current medical literature the authors cite their personal experiences. The subjects are well treated from both the hematologic and the clinical aspects and most of the current advances have been incorporated. The monograph should interest the practicing physician as well as physicians specifically interested in pathology and hematology. The citation of cases illustrating a point under discussion clarifies for the reader some of the more abstract phases of the subject. One of the most refreshing sights is the cosmopolitan character of a well chosen and current bibliography.

A Terminology of Operations of the University of Chicago Clinics. By Hilger Perry Jenkins, M.D. Paper. Price, $1. Pp. 99. Chicago: University of Chicago Press, 1935.

This is another effort directed toward establishing a terminology that could easily be set up as an operation index file in the record library of any hospital. It likewise is supposed to possess great value in determining accurately true mortality results of any operation, if any mechanical classification scheme could achieve such a purpose. No matter what clearing house center might be established, the easily understood variations of the operator's skill, the patient's resistance and unavoidable human errors, as well as omissions, might negative its statistical value in that regard. Possibly the effort, in its admission that local usage is not ignored, lacks the breadth and scope of the "Names of Surgical Operations" prepared by the Special Committee of the Western Surgical Association, which was intended not only for national but for international use of librarians or statisticians and as a means of valid simplification and reduction in the number of names that must be employed by clinicians, medical writers, editors and students already overburdened with memory feats. This volume, from the University of Chicago, giving due credit to the Western Surgical Association's "Names of Surgical Operations," still further reduces the number of names of operations from 742 to 665 and yet retains ninety-five operations bearing the names of surgeons, an apparently unnecessary inclusion. Coming from its source, one is surprised to find the name of Toufick Nicola misspelled. The book represents a further laudable attack on superfluous names of operations and may be found helpful by hospital librarians. Its rather weak binding and too thin cover may interfere with its length of life in office handling.

Mother and Baby Care in Pictures. By Louise Zabriskie, R.N. Cloth. Price, $1.50. Pp. 196, with 187 illustrations. Philadelphia, Montreal & London: J. B. Lippincott Company, 1935.

This exceedingly interesting volume teaches antepartum care and baby care with some excellently developed pictures and with a minimum amount of text matter. The book follows well established procedures for the most part and is all together an exceedingly useful work. Physicians will find it most helpful for recommendation to intelligent patients and they will find its presentation so definite as to answer in a common sense way the majority of questions that occur to prospective mothers and those responsible for the care of the child.

The Special Procedures in Diagnosis and Treatment: An Outline for Their Understanding and Performance. By Don Carlos Hines, M.D., Clinical Instructor in Medicine, Stanford University. Paper. Price, $1. Pp. 66, with 2 illustrations. Stanford University, Calif.: Stanford University Press, 1935.

This booklet is an outline of a course of lectures and demonstrations given for the fourth year students of the Stanford University School of Medicine. The methods given have been used in the medical wards of Stanford University hospitals for many years. Four pages are devoted to observation of body temperature, pulse and respiration. There are five pages on the regulation of the activity of patients and general hygienic measures. There are twelve pages on subcutaneous medication. Blood transfusion, the stomach tube, local measures directed toward the bowel, hydrotherapy, thoracentesis, abdominal and pericardial paracentesis, spinal puncture, mechanical measures in the treatment of edema, oxygen and carbon dioxide therapy are all presented in brief outline form. A few well chosen references are given at the end of each subject. The booklet should prove to be useful to interns in dealing with various emergencies and complications. It easily fits into any coat pocket and has a durable spiral binding.

An Introduction to Human Anatomy. By Clyde Marshall, M.D., Department of Anatomy, School of Medicine, Yale University. Cloth. Price, $2.50. Pp. 385, with 252 illustrations. Philadelphia & London: W. B. Saunders Company, 1935.

This is a small textbook for elementary students. It consists of 314 pages plus thirty-six on embryology. The text is brief, reliable and remarkably comprehensive, considering its brevity. Only the larger gross structures are mentioned. Brief paragraphs on function are included in each section. The illustrations are well selected from standard books and include microscopic anatomy. The author has done well in devoting in an elementary textbook so large a proportion of space to illustrations. The brief, concise text, the notes on function, and the good illustrations make it an excellent elementary textbook.

Atlas of Pathological Anatomy. Volume II. Compiled by E. K. Martin, M.S., F.R.C.S. Issued under the direction of the editorial committee of the British Journal of Surgery. Cloth. Price, $15. Pp. 475, with illustrations. Baltimore: William Wood & Company, 1935.

The second volume of this atlas is well up to the standard of its predecessor. Here the sections included are pathologic lesions of articulations, thyroid gland, tongue, pharynx, esophagus, intestinal tract, bladder, prostate, testis and penis, bone cysts and miscellaneous conditions. Each chapter begins with a clear, succinct general discussion of the lesions illustrated. Each picture is accompanied by a brief clinical history and a description of the macroscopic appearance of the specimen. The colored reproductions may be considered classic. A word of praise must be spoken also for the binder and the printer. In addition to being highly instructive, the volume is a joy for the eye.

La diphtérie maligne. Par R. Poinso, professeur agrégé à la Faculté de médecine. Paper. Price, 18 francs. Pp. 112, with 13 illustrations. Paris: Masson & Cie, 1935.

This booklet reviews the genesis, the morbid anatomy, the clinical manifestations, the diagnosis, the prognosis and the treatment of the severe forms of diphtheria. Succinct accounts are given of the various clinical forms of the disease.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Failure to Remove Steel Particle from Eye.—The head of a nail struck the plaintiff in the eye on August 23. Dr. Bulpitt, a physician-employee of the defendant, to whom the plaintiff went for treatment, examining the eye with a magnifying glass, found a lineal laceration of the cornea, with air bubbles present. He removed some particles of rust but did not examine the laceration to see how far it extended or attempt to extract anything therefrom. He washed out the eye with boric acid, instilled a mild protein silver solution and covered the eye with a pad, which was repeated daily until September 3, when he discharged the patient as recovered. On October 23 the plaintiff returned, complaining of pain and diminishing sight. The physician treated him for seven days, when he sent him to Dr. Osburn, an eye specialist, who removed a piece of steel from the eye. Some days later the retina collapsed and the plaintiff finally lost the entire sight of his eye. He then brought suit against the defendant.

At the trial, Dr. Osburn was permitted to testify that when he first examined the plaintiff's eye he found a puncturing injury in the cornea, and a window or tear in the iris with scars and inflamed vitreous, and that by the use of an ophthalmoscope he determined the presence of a piece of steel embedded in the vitreous, which he removed. The loss of sight, he further testified, was caused by the presence in the patient's eye of a foreign body, that the removal had nothing to do with the loss of vision, and that the length of time the particle remained in the eye contributed considerably to the loss of vision, as a result of the inflammation resulting from its presence. Another physician testified that the customary means used by physicians to determine the presence or absence of a foreign body in the eye are the ophthalmoscope and the x-rays. Notwithstanding this evidence, the trial court entered a judgment of non-suit and the patient appealed to the district court of appeal, second district, division 1, California.

The evidence just noted, said the district court of appeal, was sufficient to establish a prima facie case. The legitimate inference to be drawn from it is that the attending physician should have suspected the presence of a foreign body in the eye, that in failing to make such examination as would make reasonably certain that there was nothing in the eye he failed to exercise that degree of care which the practice of his profession requires, and that this lack of care was the proximate cause of the loss of sight. It is difficult to understand how a physician examining the injured eye and viewing the air bubbles and the laceration present could feel that he had exercised ordinary care and skill without making any examination to see how deeply the injury extended, or doing anything to give reasonable assurance that there was no foreign body in the eye. The attending physician even neglected to use x-ray apparatus that was in his office. For these reasons the court concluded that the trial court erred and reversed the judgment of non-suit.—*McBride v. Saylin (Calif.), 48 P. (2d) 179.*

Dental Practice Acts: Advertising to Practice "Modern Dentistry Cheap" as "Advertising Prices for Professional Service."—Donohue sought to enjoin the Oregon state board of dental examiners from revoking his license to practice dentistry. The trial court sustained a demurrer interposed by the board and dismissed the suit. Donohue then appealed to the Supreme Court of Oregon.

Donohue had inserted in a certain newspaper an advertisement which stated, among other things, that he practiced "not cheap dentistry but modern dentistry cheap." The board claimed, as the basis for the revocation proceedings before it, that this advertisement constituted "advertising prices for professional service," which the Oregon dental practice act denominates as "unprofessional conduct" and as such cause for revoking the license of an offending licentiate. The question to be determined then, said the Supreme Court, is whether or not advertising to practice "modern dentistry cheap" is embraced in the prohibition against "advertising prices for professional service." If it is, the action of the trial court was proper, as the board in instituting the revocation proceedings was acting lawfully. While in the advertisement complained of Donohue did not state any definite or fixed price, nevertheless he conveyed to the public the idea that his charge for dental services would be lower than that ordinarily made for such work. The court could not agree with Donohue's contention that he could advertise in any manner whatsoever "prices for professional services," provided only he avoided stating any definite or fixed price. Were the plaintiff's contention to be upheld, continued the court, he could with equal propriety advertise that he would do dental work cheaper than any other dentist. All sorts of catch phrases covering prices as a lure or bait for the public would be the order of the day by those who care not for the ethics of a profession. However, the plaintiff is not dealing in commodities. He is a member of a learned profession. The rules of the market place do not apply.

That it was the intention of the legislature to prohibit such kind of advertising relating to prices for dental services, the Supreme Court said, is further indicated by a consideration of the history of the enactment of the pertinent portion of the dental practice act. House Bill 148, eventually enacted as Laws, 1933, c. 166, as originally introduced enumerated as unprofessional conduct, which was to be a ground for the revocation of a license, "advertising definite, fixed prices when the nature of the professional service rendered and the materials required must be variable." This was amended to read "advertising prices for professional service," and, as amended, was enacted. Hence the court concluded that the legislature was not content merely to prohibit advertising fixed or definite prices. It intended to go further and put a ban on all kinds of advertising relative to prices which have a tendency to lure the ignorant or credulous.

The court accordingly affirmed the decree of the lower court dismissing the plaintiff's bill for an injunction.—*Donohue v. Andrews (Ore.), 47 P. (2d) 940.*

Malpractice: Drainage Tube Left in Abdomen—Accrual of Cause of Action.—The physician-defendant operated on the patient, Jan. 3, 1931. Apparently, a 9 inch rubber tube was used to drain the wound, which the defendant neglected to remove after it had served its purpose, allowing it to remain in the patient's abdomen until he removed it on Sept. 26, 1932. In the interim between the two operations the patient suffered from "numerous running sores within the . . . abdomen." The patient and her husband instituted action for malpractice on Jan. 7, 1933, but the trial court entered a judgment for the physician, holding that the suit was barred by the statute of limitations. The plaintiffs then appealed to the district court of appeal, second district, division 2, California.

An action for malpractice, said the district court of appeal, sounds in tort and not in contract and must be instituted within one year from the occurrence of the negligence which forms the basis of the action. It is necessary, then, to determine what event started the running of the statute and when that event occurred. It seems certain that this action was not brought within one year from the date of the operation itself or within one year from the first date of the wrongful maintenance of the tube in the abdomen. The plaintiffs, however, claimed (*a*) that the operation from its beginning to the end of the postoperative treatment was one act and that the statute did not begin to run until the treatment ceased; or (*b*) that from the date on which the tube should have been removed but was not, to the date of its removal, there was a continuing tort, and that the maintenance of the tube in the abdomen for any time within the year prior to the institution of the suit constituted a cause of action. However, the district court of appeal could find no basis for those contentions in any California cases. Many California cases, in the opinion of the court, either hold or are consistent with the holding that the initiatory wrongful act starts the running of the statute. The initiatory wrong in this case was leaving the drain tube in the abdomen after the day on which it should have been removed. The statute of limitations runs from that day, which the court held in any event was more than one year prior to the institution of this suit.

The court believed that the doctrine of fraudulent concealment, if applied to the facts alleged in the pleadings of this case, would toll the statute. But, said the court, counsel for the plaintiffs concede in their brief that an allegation in the complaint that the defendant knowingly permitted the tube to remain in the abdomen meant simply that the defendant left it there through gross negligence and did not consciously know that it had been left therein. This concession takes the case out of the doctrine of fraudulent concealment.

For the reasons stated, the judgment in favor of the defendant was affirmed.—*Huysman v. Kirsch (Calif.), 47 P. (2d) 332.*

Malpractice: Sponge Left in Abdomen.—The patient was operated on at the Santa Clara County, Calif., hospital by the physician-defendant assisted by a hospital intern and by various hospital nurses. Subsequently another physician removed a sponge from her abdomen. She died later and her administrator sued the defendant. From a judgment on the verdict of the jury for the defendant, the plaintiff appealed to the district court of appeal, first district, division 2, California.

The district court of appeal found no error in an instruction given by the trial court which told the jury that the mere fact that a sponge was found in the patient's abdomen would not support a verdict against the operating physician and that, to recover, the plaintiff must establish that the sponge was left there because the physician failed to exercise ordinary care. The plaintiff contended that the alleged negligence in this case was negligence per se and the jury should have been so instructed, but the court believed the correct principle, as announced in *Jackson* v. *Hansard,* 45 Wyo. 201, 17 P. (2d) 659, was that:

> The question of due care was not a question of law but was one for the jury to decide, subject, of course, to the ordinary right of the trial judge in such cases.

The trial court gave another instruction, which among other things stated that, if it were just as possible that the sponge was left there by the negligence of another as by the defendant's negligence, then the jury's verdict must be in favor of the defendant. It also instructed the jury that if it found from the evidence that the intern or the nurses present at the operation were not in the pay or employ of the defendant then any negligence, if any, committed by any of the assistants cannot be charged to the defendant unless the jury found that the defendant directed the act complained of or that he knew of the existence of such negligent conduct and had a chance to remedy the fault but failed to do so. The plaintiff contended that these instructions were erroneous because the relation of respondeat superior existed between the defendant and the assistants. With this contention, however, the district court of appeal did not agree, holding that the relation of master and servant did not exist between the defendant and any other person present in the room at the time the operation was performed.

The judgment in favor of the defendant was accordingly affirmed.—*Ales v. Ryan (Calif.), 47 P. (2d) 771.*

Workmen's Compensation Acts: Perforation of Peptic Ulcer Allegedly Due to Strain.—Abelseth had evidenced the symptoms of a peptic ulcer since 1916, receiving medical and hospital treatment therefor at various times. In the course of his employment, in October 1932, while he and a fellow workman were unloading a 200 pound cabinet from a truck, he had to assume a "slightly twisting" position. He immediately experienced severe stomach pains, was nauseated, and was forced to cease work. An operation performed on him that same day revealed a perforation of a gastric or duodenal ulcer. He instituted proceedings under the workmen's compensation act of California but the industrial accident commission denied him compensation and he appealed to the district court of appeal, first district, division 1, California.

The acceleration or aggravation of a preexisting disease, said the district court of appeal, is an injury attributable to the occupation causing such acceleration or aggravation and hence is compensable. The question to be determined is whether the perforation of the ulcer was the result of the muscular exertion arising in the course of the workman's employment or whether it resulted from the natural progressive nature of the ulcer itself. The medical evidence is in substantial conflict. The workman's family physician testified, in response to a hypothetical question, that the strain of lifting could be and probably was the precipitating cause of the perforation at that particular moment. A physician who had assisted in the operation stated in a letter to the commission that it was conceivable that a penetrating ulcer might be caused to rupture by unusual exertion or a strenuous lifting whereby a marked increase in intra-abdominal tension would be brought about, but that, however, it is not unusual for penetrating peptic ulcers to rupture spontaneously while the patient is at rest. A physician who examined the workman at the request of the commission stated that in his opinion it was very improbable that the perforation was the result of lifting. His opinion, he stated, was in part based on the fact that the operating physician had informed him that no adhesions were present and that a microscopic test had shown the base of the ulcer to be thin and the muscular coat replaced by granular tissue—a soft, extremely weak tissue. Because of the conflict of the medical testimony, the district court did not feel warranted in disturbing the award of the commission, denying compensation to the workman.—*Abelseth v. Industrial Accident Commission (Calif.), 47 P. (2d) 516.*

Malpractice: Burns Sustained by Patient from Upset Sterilizer.—The plaintiff, who had been sick with the "grip" for two or three weeks, went to the defendant for a general physical examination. While in the defendant's office, he complained of feeling faint and the defendant placed him on a stool and instructed him to hang his head down. Suddenly the patient lost consciousness, fell forward from the stool, upsetting a nearby sterilizer, and sustained a burn from the hot water. In a suit for damages, the jury returned a verdict for the plaintiff for $5,000 but the trial court gave judgment for the defendant, notwithstanding the verdict. The plaintiff appealed to the Supreme Court of Pennsylvania.

The plaintiff contended that the defendant was negligent in that, knowing him to be in a fainting condition, he placed him on a stool without a back, three or four feet from a receptacle containing boiling water. The plaintiff's counsel argued that the patient was a business invitee of the physician and that hence the case was governed by rules applicable to that relation rather than by those concerning the liability of a physician for negligent treatment of a patient, which involve questions as to the proper exercise of professional skill and judgment. With this argument, however, the Supreme Court could not agree. If the plaintiff's injury, the court said, were the result of some defect in the premises, or of some negligent arrangement of the appliances therein, there might be some merit in the argument. In this case the accident took place while the physician was actually treating the patient, and as a result of the method which he employed in doing so. The inquiry was, therefore, not whether something was wrong with the premises but whether something was wrong with the defendant's treatment of his patient. The plaintiff called no witness to testify that it was not proper treatment under the circumstances for the defendant to seat the plaintiff on a stool and to instruct him to put his head down when he complained of feeling faint. A number of medical witnesses testified that this was the proper thing to do. Their conclusion from hearing the entire testimony was that the plaintiff had not fainted but that he had had a convulsion. In the absence of proof that what the defendant did was not according to such reasonable care, skill and diligence as is ordinarily exercised in his profession, there may be no recovery.

The boiling water, observed the court, was but incidental to the entire happening. Its only effect was probably to cause more serious injuries than would have occurred if some other object had been the causal factor. If the plaintiff had fallen from the stool and injured himself by contact with some other object in the physician's office, the legal situation would be the same. No witness testified that the care exercised under the circumstances was not all that should have been exercised. The evidence did not indicate that the defendant should have anticipated that the plaintiff would fall, and the fact that he did fall in itself was no evidence of negligence on the part of the defendant. The Supreme Court affirmed the judgment of the trial court for the defendant.—*Saltzer v. Reckord (Pa.), 179 A. 449.*

Society Proceedings

COMING MEETINGS

American College of Physicians, Detroit, Mar. 2-6. Mr. E. R. Loveland, 133 South 36th Street, Philadelphia, Executive Secretary.
American College of Radiology, Chicago, Feb. 16. Dr. Benjamin H. Orndoff, 2561 North Clark Street, Chicago, Executive Secretary.
American Heart Association, New York, February 3. Dr. H. M. Marvin, 50 West 50th Street, New York, Acting Executive Secretary.
American Orthopsychiatric Association, Cleveland, Feb. 20-22. Dr. George S. Stevenson, 50 West 50th Street, New York, Secretary.
American Society for Experimental Pathology, Washington, D. C., Mar. 25-28. Dr. Shields Warren, 195 Pilgrim Road, Boston, Secretary.
American Society for Pharmacology and Experimental Therapeutics, Washington, D. C., Mar. 25-28. Dr. E. M. K. Geiling, 710 North Washington Street, Baltimore, Secretary.
American Society of Biological Chemistry, Washington, D. C., Mar. 25-28. Dr. H. A. Matill, Chemistry Bldg., State University of Iowa, Iowa City, Secretary.
Annual Congress on Medical Education, Medical Licensure and Hospitals, Chicago, Feb. 17-18. Dr. W. D. Cutter, 535 North Dearborn Street, Chicago, Secretary.
Federation of American Societies for Experimental Biology, Washington, D. C., Mar. 25-28. Dr. E. M. K. Geiling, 710 North Washington Street, Baltimore, Secretary.
Mid-South Post-Graduate Assembly, Memphis, Tenn., Feb. 11-14. Dr. A. F. Cooper, Goodwyn Institute Building, Memphis, Tenn., Secretary.
Pacific Coast Surgical Association, Del Monte, Calif., Feb. 20-22. Dr. Edgar L. Gilcreest, 384 Post Street, San Francisco, Secretary.
Southeastern Surgical Congress, New Orleans, March 9-11. Dr. Benjamin T. Beasley, 478 Peachtree Street N.E., Atlanta, Ga., Secretary.

CENTRAL SOCIETY FOR CLINICAL RESEARCH

Eighth Annual Meeting, held in Chicago, Nov. 1 and 2, 1935

The President, DR. CYRUS C. STURGIS, Ann Arbor, Mich., in the Chair

(Concluded from page 328)

Thrombocytopenia Due to Food Allergy

DRS. THEODORE L. SQUIER and FREDERICK W. MADISON, Milwaukee: It has been shown that the granulocytes in the circulating blood may be depressed as the result of an allergic response to drugs, and in a less marked degree after the ingestion of specific foods. It seemed reasonable that the thrombocytes might be expected to respond similarly. Loewy has observed such a thrombocytopenic reaction to allyl-isopropyl-acetyl-carbamide, and Peskin and Miller to quinine and ergot. Evidence is submitted to indicate that in certain hypersensitive individuals the ingestion of some specific foods may cause a definite depression of the thrombocytes and the clinical picture of purpura as well. Depression of thrombocytes was observed after the ingestion of some, not all, of the foods to which hypersensitivity was demonstrated. Marked clinical improvement and recovery has been observed in patients with typical thrombocytopenic purpura following elimination of specific reacting foods, and subsequent ingestion has been followed by a prompt fall in the platelet count.

DISCUSSION

DR. OVID OTTO MEYER, Madison, Wis.: I would like to ask whether the authors have tested any cases in which the spleen had previously been removed. If so, whether or not the results were modified.

DR. FRANK J. HECK, Rochester, Minn.: Was the bleeding time tested or the clot retraction noted? Also, what method of platelet counting was used? It seems to me that they must have an extremely accurate method.

DR. LEON G. ZERFAS, Indianapolis: The relationship of food allergy to thrombocytopenia is interesting. During the course of observation my associates and I have noted no evidence of a decrease in the number of platelets in the circulating blood when rabbits were repeatedly sensitized to foreign protein such as horse serum. Repeated attempts at sensitizing and desensitizing rabbits by alternating periods of subcutaneous and intravenous injections of foreign protein finally resulted in almost complete destruction of the bone marrow as well as certain changes in other organs. When such marked pathologic changes in the marrow resulted, a reduction in the number of blood platelets along with other formed elements in the blood can be expected. This phase of the work, however, needs more careful study.

DR. THEODORE L. SQUIER, Milwaukee: We have not had an opportuntiy to observe any of these patients following splenectomy. The clotting time was determined and there was no retractility of the clot. The platelet counts were made by the pipet method in a counting chamber, using Diner's fluid for dilution. We regard this reaction as only one of the possible factors that may be involved in thrombocytopenic purpura. Reactions of this nature have been observed by others to drugs. We believe that our observations of such reactions to specific foods offer to the clinician a more hopeful clinical approach than has been possible heretofore.

A Possible Test for Activity of Peptic Ulcers

DR. MEYER B. MARKS, Chicago: Permeability of the adult human gastro-intestinal tract to foreign protein (egg albumin) has been studied with precipitin tests on blood and urine. The urines of normal patients without gross lesions in the mucosa as a rule do not give positive tests, urines from patients with active peptic ulcers gave a positive test in 75 per cent of the cases, and urines from patients with healed ulcers gave negative tests in 80 per cent of the cases. This test promises to be valuable in the differentiation of ulcer from other upper abdominal lesions and in determining the question of activity of ulcers under treatment.

The Rôle of Indigestible Food Residues in Laxation

DRS. RAY D. WILLIAMS and WILLIAM H. OLMSTED, St. Louis: Of late we have been concerned with the physiologic effects of the indigestible residue fraction (lignin, cellulose and hemicellulose) in foods. In a previous paper we demonstrated by a new method that "crude fiber" is not a chemical entity. Our method, which determines separately lignin, cellulose and hemicellulose, made possible a reinvestigation of (1) the determination of these products in foods containing indigestible residues, (2) what becomes of each of these fractions when fed to the human subjects, and (3) what is the rôle of cellulose, lignin and hemicellulose in their effects on the bulk of the stool.

In outline of our plan, the experiment was to isolate indigestible residues from natural occurring sources with as little change as possible in their original composition. These residues were obtained from carrots, cabbage, canned peas, wheat bran, alfalfa leaf, corn germ meal, cottonseed meal, sugar beet pulp, cellulose flour and agar agar. We added these materials to a basal diet free from indigestible residue and analyzed the stools for lignin, cellulose and hemicellulose, volatile fatty acids and soluble reducing substances. Three medical students were used as subjects. Each material was fed with the basal diet for one week. Three basal periods were interspersed between the periods of food residue feedings. By analysis of the feces it was found that hemicellulose disappeared in larger amounts than cellulose and that lignin disappeared least.

When there was a high percentage of lignin in the residue, less hemicellulose and cellulose disappeared from the intestine.

The comparison of the stool weights after feeding of these residues seemed to indicate that the amount of cellulose and hemicellulose disappearing during the passage through the human intestine influenced the volume of the feces more than the amount of residue fed or the amount recovered in the feces.

Stool volatible fatty acids were greatest in the case of residue that disappeared most during the passage through the gastro-intestinal tract.

A rating made by the subjects themselves as to the relative laxative efficiency of the materials corresponds quite closely to the degree that hemicellulose and cellulose disappeared from the intestine.

The sum and substance of this physiologic experiment goes to prove that the so-called bulk of the human diet is not inert material going through the intestinal tract unchanged but rather that it is acted on by bacteria to a great degree and that it is these split products of bacterial action that stimulate the intestine.

DISCUSSION

DR. DONALD P. ABBOTT, Chicago: It has been known for years that the more undigested food comes through the small bowel into the colon, especially the carbohydrate food, the more fermentation occurs. When this carbohydrate undergoes bacterial decomposition, which is spoken of as fermentation, numerous acids and gases are produced, which stimulate peristalsis. The fact must not be lost sight of that gases stretching the

colon will stimulate peristalsis. The fatty acids naturally would be one of the factors that would stimulate peristalsis also. The carbohydrate is probably the more marked cause of laxation, as it comes through undigested with the production of various gases and acids in the colon. The cellulose content of vegetables will vary somewhat in its consistency. By cooking vegetables one reduces the character of the cellulose to more or less the same level of irritability and also makes the carbohydrate content more accessible to the digestive enzymes.

DR. WILLIAM H. OLMSTED, St. Louis: If the term "bulk" is used in the sense of something in the diet that goes through the intestinal tract unchanged, it is a misleading term. The residues isolated from carrots, cabbage and peas are all subsequently broken down during the passing through the intestinal tract. The residues from feeding stuffs, alfalfa, corn germ meal, cottonseed meal and bran were also broken down. These substances were acted on by bacteria in varying degrees and there seems little doubt that those residues which were more extensively broken down proved to be most laxative. Where the residues contained substantial amounts of lignin, which is very resistant to bacterial action, the resulting stools were hard and so irritating that bleeding resulted. Bran is one of these substances and is not particularly adapted to producing laxation. Several of the other products examined were superior to bran in this respect. I am inclined to believe that the volatile fatty acids are stimulating to the intestine, but there may be other metabolic products which are equally stimulating. We feel that some of the products which we have examined may prove more satisfactory than bran and agar, and perhaps cost less.

Effect of Splanchnic Resection and of Vagotomy on Gastric Motility

DRS. LOUIS E. BARRON and GEORGE M. CURTIS, and WILLIAM T. HAVERFIELD, A.B., Columbus, Ohio: Gastric motility was investigated on two patients before and after bilateral splanchnic resection for juvenile diabetes. This was accomplished in two stages. Graphic records were obtained by the balloon method prior to and after each stage. Adequate control observations were made. Following unilateral splanchnic resection there ensued short periods of motility alternating with short periods of quiescence. This was observed for approximately one week. Subsequently there ensued intense persistent gastric motility and an augmentation in gastric tonus. Following bilateral splanchnic resection the results simulated those following unilateral splanchnic resection. Gastric motility also was studied on a patient with a symptom complex of vagotonia. Observations were made during an adequate control period, during a period of intense atropine medication, and following left abdominal vagotomy. The results indicated that during atropine medication there was a slight decrease in activity and in tonus. Following vagotomy there ensued a decrease in motility with a marked increase in the duration of gastric quiescence. The number of contractions during a period of activity was also diminished. Also the influence of the extrinsic innervation on the emptying time of the stomach was studied. Following unilateral splanchnic resection, practically no change was observed. During the control period it was four hours and forty-five minutes. Following unilateral splanchnic resection it was four hours and forty-one minutes, a difference of four minutes. Following bilateral splanchnic resection the average emptying time was three hours and forty-two minutes, a difference of one hour and three minutes. In the patient with vagotonia, the average emptying time during the control period was six hours and forty-nine minutes. During intense atropine medication it was five hours and twelve minutes. Following vagotomy the average emptying time was two hours and forty-nine minutes, four hours shorter than during the control period. The postoperative convalescence of all patients was uneventful. Subsequent clinical improvement occurred.

DISCUSSION

DR. W. M. CRAIG, Rochester, Minn.: The observations which Dr. Barron and his colleagues have made seem to be extremely important to those who are interested in the function and surgery of the sympathetic nervous system. It is such observations that aid in clarifying much of the confusion that exists with regard to an understanding of the physiologic activity of the splanchnic nerves. Prior to our early operations on the splanchnic nerves, my associates and I were apprehensive of their effect on the gastro-intestinal tract, because in experimental studies on animals a marked reaction was observed. To study our patients preoperatively, we made careful analyses of gastric acidity and observed motility under the fluoroscope. The observations made before and after operation did not indicate any marked change, and we have not noticed any discomfort on the part of the patients. Dr. Barron and his colleagues have made a more careful and precise observation on the gastric motility, both before and after operation, and it may prove of value in the further study of these cases. I should like to ask Dr. Barron whether or not there were any clinical manifestations of these changes.

DR. GÉZA DE TAKÁTS, Chicago: The question that arises in connection with the observations of the authors is whether the increased peristalsis and more rapid emptying time of the stomach are in any way related to the increased sugar tolerance of patients who have been subjected to splanchnic nerve section. To overcome the objection that this increased sugar tolerance is merely due to a more rapid passage and therefore a decreased absorption of sugar from the gastro-intestinal tract, I have used intravenous sugar tolerance tests and shown that even under such conditions the utilization of sugar has increased. With regard to the great increase in gastric motility as observed by the authors, I have observed a peculiar type of pain which does not correspond to an intercostal segmental type and which I rather suspected of being due to pyloric spasm. At any rate, such pain coming on soon after operation and persisting for several weeks may be relieved by atropine. I have studied the emptying time of only two patients before and after splanchnic nerve section and found them to be decreased to approximately two thirds of the preoperative values. In connection with the observations of the authors on the effect of vagotomy on peristalsis I may cite a patient of Dr. Keeton's at the Illinois Research and Educational Hospital who had a "nervous" diarrhea for thirty years. The number of rectal contractions were studied with the balloon method. In this case I sectioned the pelvic parasympathetic nerves and obtained a decrease in the number of stools from twelve to an average of two a day. The balloon registered smaller contractions with much longer periods of quiescence after the operation. This is the first case known to me in which the parasympathetic supply to the distal half of the colon had been successfully cut. The most important conclusion from the work of the authors is that the extrinsic denervation of the gastro-intestinal tract results in permanent changes in motility and is not temporary, as has been so often stated.

DR. N. S. DAVIS III, Chicago: Was there any effect on the blood pressure in splanchnic resection?

DR. LOUIS E. BARRON, Columbus, Ohio: We made observations on the gastric acidity before and after unilateral and bilateral splanchnic resection and also before and after vagotomy. We observed no changes of any magnitude in the acidity following any of these surgical procedures. Concerning the clinical manifestations, although it is reported that abdominal cramps frequently follow bilateral splanchnic resections, we observed them only in one instance. We had no reason to connect them with the operation. I would prefer to leave discussion of the diabetic question to a subsequent report. We did note, however, a decrease in the insulin requirement on both patients. One patient required 90 units of insulin daily during the preoperative period. Following bilateral splanchnic resection, it dropped to 30 units. Concerning blood pressure changes, we noticed a transitory drop, which persisted for about a week or two. After that, it gradually returned to its original level.

Gastric Acidity Following Operations for Gastric and Duodenal Ulcer

DR. WALTMAN WALTERS, Rochester, Minn.: Studies of gastric acidity were carried out in a group of 136 patients operated on for gastric and duodenal ulcer by gastro-enterostomy, pyloroplasty, and gastric resection of the first Billroth and Polya types. Reduction in gastric acidity occurs following all these procedures, although most frequently, and to the greatest extent, following gastric resection of the posterior Polya type. Reduction in acidity also occurs following the first Billroth operation and posterior gastro-enterostomy. When anterior gastro-

enterostomies are performed for duodenal ulcer combined with entero-anastomosis (the latter preventing regurgitation of any great amount of duodenal and jejunal secretion into the stomach), very little reduction of gastric acidity takes place. Such reduction of acidity appears to be relative and is largely the result, in most cases, of dilution of gastric secretion by the intestinal secretions. Contrary to the ideas of many, relative achlorhydria does not occur in all cases of gastric resection performed for duodenal ulcer, even though a large portion of the stomach is removed. Gastric ulcer, on the other hand, appears to be biologically quite different in the response of acid gastric secretion following operative procedures. Partial gastrectomy of any type, including removal of the gastric ulcer, is followed by a relative achlorhydria in practically every case. This occurs also in a high percentage of cases in which local excision of small gastric ulcers has been combined with gastro-enterostomy. This probably accounts for the fact that gastrojejunal ulcer practically never occurs following operative procedures for gastric ulcer.

DISCUSSION

DR. CLARENCE F. G. BROWN, Chicago: I should like to ask whether the author had the opportunity to test the acidity perhaps two, three or five years after operation, and, if so, did the acidity return to normal?

DR. WALTER L. PALMER, Chicago: The conclusions drawn are, in general, quite in accord with my experience. However, I should warn against drawing conclusions with regard to the gastric chemistry on the basis of test meals carried out over periods of one or two hours only. In many of these cases of apparently low acidity, high values will be found if the stomach is aspirated at frequent intervals over a period of from twelve to twenty-four hours, or if repeated test meals are run. This is particularly important in the study of the effects of gastro-enterostomy and partial gastrectomy for duodenal ulcer. In those cases in which free acid is apparently markedly lowered, continued observation will usually show a high level of free acid at some time or other.

DR. ADOLPH SACHS, Omaha: I should like to ask Dr. Walters whether the decrease in hydrochloric acid is due to a dilution process or to an actual reduction in acidity, or to both; and, if he considers both, which factor he thinks is the most important.

DR. HEINRICH NECHELES, Chicago: A number of patients that had complaints after subtotal gastrectomy had either too high or too low gastric acidity. In the latter case, gastroscopy revealed the presence of gastritis, and administration of dilute hydrochloric acid was beneficial. If the aim of subtotal gastrectomy is abolition of gastric acidity, so that duodenal reflex cannot be neutralized and bacterial growth cannot be checked, gastritis may occur consequently.

DR. WALTMAN WALTERS, Rochester, Minn.: Of further importance in the study of postoperative gastric acidity is the point that was brought out in the discussion, namely, that one must have more information about the acidity tests over a long period of time following operation, associated with a study of the clinical results, in order to arrive at any definite conclusion regarding the postoperative acidity factor. Four years ago Dr. Snell and I studied the relation of gastritis to duodenal ulcer. I think we were able to prove that gastritis in this country in relation to duodenal ulcer exists in very few cases in contrast to its association with duodenal ulcer in certain European countries. This is important, for the advocates of gastric resection as a routine treatment for duodenal ulcer have based their opinion on the importance of such procedure in that, first, it removed the areas of associated gastritis, and, secondly, that the relative achlorhydria which followed gastric resections made recurrence of ulcer impossible, and failure to obtain a relative achlorhydria following gastric resection occurred because an insufficient amount of stomach had been removed. I believe it is true that, if a relative achlorhydria is obtained and persists, the patient stands very little chance of developing a recurring ulcer. Unfortunately, however, even after extensive gastric resections achlorhydria fails to follow in about 50 per cent of the cases. Among forty-seven cases reported from an eastern clinic in which there was persistent acidity after gastric resection, ulcer recurred in nine cases. In gastric resections the risk of operation is from five to ten times greater than the risk with gastro-enterostomy, the risk depending on the size and degree of the infiltration of the duodenal ulcer and the difficulty of closing the end of the duodenum after the removal of the ulcer. It is necessary to keep an open mind on the problem of gastric resection in the treatment of duodenal ulcer until more knowledge has been obtained of the changes in acidity that follow and the rôle they play in recurring ulcers.

Effect of Adrenal Cortex Extract on Sodium Metabolism in Addison's Disease

DRS. E. J. KEPLER and A. M. SNELL, Rochester, Minn.: To demonstrate physiologic activity of parenterally administered adrenal cortex extract Kendall metabolic studies were conducted on three patients with severe Addison's disease in whom the intake of sodium was reduced to minimal amounts. Provided the dosage of extract was adequate it was possible to keep these patients in good condition for comparatively long periods of time on virtually salt-free diets. Under these conditions the loss of sodium through the urine was negligible. The evidence indicates that a potent cortex extract is physiologically as active when given to patients with Addison's disease as when administered to adrenalectomized animals.

DISCUSSION

DR. A. M. SNELL, Rochester, Minn.: This work was done with the intention of answering the objections of Rogoff and others as to the efficacy of adrenal cortex extract in Addison's disease. That it is clinically effective can hardly be disputed; in fact, the acid test of this extract is its ability to keep the patient with Addison's disease in good condition and in sodium equilibrium while on a salt-free diet. Before anything was known about the relation of the extract to sodium metabolism, it was found that the original cortical extracts prepared by Swingle and Pfiffner would keep patients in good condition without reference to salt, a point that seems to have been more or less forgotten. There are some problems yet to be solved. It is not known whether a normal individual will store sodium when given the extract or how much sodium can be stored by patients with Addison's disease on a high intake of sodium alone or with a high intake of sodium and cortex extract. These are matters which will have to be cleared up before the metabolism of sodium in normal individuals and in patients with adrenal insufficiency is fully understood.

DR. JACOB MEYER, Chicago: A patient with Addison's disease, whom I am observing at present, although receiving 10 cc. of adrenal cortex extract, is also taking as much as 26 Gm. of sodium chloride daily but is excreting approximately the same amount of chlorides. The patient developed symptoms during the night, and a rather large dose of sodium chloride was administered throughout the night. It was found that as the sodium was administered throughout the night the patient improved. I think this is an important observation and it may be that there are periods in the course of the day or night when the content of sodium is less than at other times.

DR. WILLIAM S. HOFFMAN, Chicago: I have made serum total base determinations in several hundred cases and I have very seldom found a higher than normal sodium concentration. If the figures on the chart are correct, it seems to me that the authors have demonstrated that they can maintain a higher than normal sodium by giving large injections of cortex extract. Some of the values for sodium are 150 milliequivalents per liter or higher, which is much above the normal. If these values are correct, they are physiologically quite significant.

DR. M. A. BLANKENHORN, Cincinnati: I wonder whether Dr. Kepler considered the extract made by Dr. Kendall the same as that made by the Swingle and Pfiffner method and sold as eschatin.

DR. E. J. KEPLER, Rochester, Minn.: There is very little known about the hourly variation in the excretion of sodium in Addison's disease. It is likely that at times the loss of sodium may be rapid. This may account for the sudden changes that may occur in the clinical picture. We have observed in a number of patients with Addison's disease high sodium values after salt and cortex extract were given. A characteristic feature of Addison's disease is the inability to maintain sodium in the tissues. The extract seems to act as a deterrent factor

and enables the patient to remain in sodium balance. The preparation that we are using is made by Dr. Kendall and it is not the same as eschatin.

An Adrenal Cortex Extract of Value in Addison's Disease

DRS. WILLARD O. THOMPSON, SAMUEL G. TAYLOR III, PHEBE K. THOMPSON and WILLIAM S. HOFFMAN, Chicago: Treatment of four patients with marked Addison's disease for from six to eight months with a new adrenal cortex extract (Wilson's) has demonstrated that: 1. With no more salt than that in a normal diet, a dose of 10 cc. or more daily keeps patients in a satisfactory condition and maintains the concentration of sodium, potassium and chloride in the serum within normal limits, whereas nausea and vomiting slowly develop when the patients receive only 5 cc. daily. 2. When a crisis develops, the extract alone will not revive the patient. Salt is required. 3. A large daily dose of salt alone will preserve life for a long time, but less salt and less extract appear to be required if used together than if used separately. These observations suggest that one of the functions of the adrenal cortex is to control the concentration of salt in the body. However, when the body has been depleted of salt, the extract cannot function until a supply is made available.

DISCUSSION

DR. E. J. KEPLER, Rochester, Minn.: We have used Wilson's extract and found it potent. In one case the disease was controlled with Wilson's extract when the salt intake including that in the diet did not exceed 6 Gm. daily. Recent work on the pathologic physiology of adrenal insufficiency has shown that the excretion of sodium ions is greater than the excretion of chloride ions. For example, Harrop and his associates found that "following withdrawal of injections of cortical hormone from the dog which is being given an ordinary unsalted diet, the loss of urinary sodium in equivalent weights exceeds that of chloride by 10 to 20 per cent." Better results are obtained in the treatment of adrenal insufficiency, either clinical or experimental, if, in addition to sodium chloride, sodium is given in the form of sodium citrate or sodium bicarbonate to compensate for the discrepancy that results from the increased excretion of sodium over that of chloride.

DR. WILLIAM S. HOFFMAN, Chicago: I should like to comment on the total base determination. We have decided to make total base determinations rather than sodium determinations because in our hands the former are much more accurate than the latter. Besides, in spite of the fact that adrenal cortex extract is apparently concerned with sodium metabolism, no one has demonstrated that sodium has any other function than to add to the total base that is available for neutralization of acid and for the maintenance of osmotic equilibrium. Therefore, total base values probably give a better physiologic picture than do sodium values. The recent investigations that have been made possible by the newer potent extracts of the adrenal cortex are not only important because of their obvious therapeutic value and because of their value in the study of the physiology of the adrenal gland but also because they are furnishing clues as to the mechanism of excretion of sodium and urea. That urea rises as sodium drops in the blood has been known for some time. This phenomenon occurs not only in Addison's disease but also in Bright's disease, in intestinal obstruction and in severe diarrheas. We don't know the reason for it, but we already know that the rise in urea cannot be due to a lack of excretable water, for Loeb has shown that the retention of urea occurs during the period of diuresis. Similarly in a case at the Presbyterian Hospital in which a great deal of water and salt had been lost by repeated gastric lavage, we saw that the urea became elevated even though the patient was getting and excreting about 3,000 cc. of fluid a day. The urea concentration promptly returned to normal when 9 Gm. of salt was added to the diet. It is difficult to avoid drawing the conclusion that the retention of urea is due in these cases to active resorption by the renal tubules and that it is concerned in some way with an effort to maintain the normal osmotic pressure of the body fluids.

DR. FRANK B. KELLY, Chicago: I had the privilege of observing two patients shown on the charts, one with pneumonia. She was as near death as any patient I ever saw. In regard to the medical student, the opportunity I had of watching him and his testimony as to how much better he felt when he was getting a sufficient amount of extract than when on salt alone indicates the effect which the extract used by Dr. Thompson has on patients with Addison's disease.

DR. WILLARD O. THOMPSON, Chicago: The analogy between the parathyroid glands and the adrenal cortex mentioned by Dr. Kepler is of interest. Just as the parathyroid glands affect the metabolism of calcium and phosphorus, so the adrenal cortex affects the metabolism of sodium. In hypoparathyroidism relatively enormous doses of calcium will prevent the development of tetany, and in Addison's disease relatively enormous doses of sodium will prevent the development of crises.

Excretion of Ferrocyanide in Relation to Urea Clearance

DR. WAYNE GORDON, Chicago: The rate of excretion of a standard intravenous dose of ferrocyanide has been proposed as a test of renal function by Stieglitz and Knight. An evaluation of the ferrocyanide excretion test was attempted by comparing the simultaneous urea clearance with the ferrocyanide excretion through a range of clearances from 6 to 130 per cent of normal. Normal subjects excreted 24 per cent or more of ferrocyanide in one hour, and those with lower clearances excreted less ferrocyanide in a roughly parallel fashion. When the results were discordant, collateral evidence pointed to error in the two tests with about equal frequency. Ferrocyanide administration did not effect the clearance. In the absence of hematuria the test is very simple. Its relation to glomerular filtration and its value in following the course of progressive renal diseases are *sub judice*. It promises considerable value in the detection of moderate degrees of renal impairment.

The Action of Potassium Salts and Their Excretion by the Kidney

DRS. NORMAN M. KEITH and MELVIN W. BINGER, Rochester, Minn.: The procedure followed was to give normal individuals and patients with dropsy a measured amount of a given potassium salt by mouth for several days under strict experimental conditions and to compare the urinary output of water and other constituents with that in control periods before and after the ingestion of salt. The salts taken were the chloride, nitrate, bicarbonate, acetate and citrate. Potassium salts, when ingested by a normal individual, are quickly absorbed and a high percentage is excreted by the kidneys. The volume of urine increases and the concentration of potassium in the urine may rise to fifty times that of the serum. Similar effects have been obtained in selected cases of dropsy. Chemical studies in the urine included estimations of the hydrogen ion concentration, the excretion of the electrolytes potassium, sodium, chloride, sulfate, phosphate and bicarbonate, and the urea and ammonia nitrogen. The decided increase in potassium was accompanied by a shift in the p_H to the alkaline side, the most marked shift occurring after the bicarbonate, acetate and citrate. These three potassium salts were evidently excreted by the kidney chiefly as bicarbonate. The increase in potassium bicarbonate was accompanied by a marked decrease in the ammonia nitrogen, a condition similar to that found after the ingestion of sodium bicarbonate.

DISCUSSION

DR. M. HERBERT BARKER, Chicago: I appreciate Dr. Binger's remarks relative to potassium, because for years I have been laboring in fear of giving it clinically, especially to those with vascular or renal disease. For five years I have given potassium chloride in variable quantities to quite a large number of patients, and so far I have not experienced evidence of toxic manifestations. In fact, I do not know what the toxic manifestations are aside from gastro-intestinal disturbance. The physiologist notes cardiac arrest, but clinically in the long series of patients taking it as long as four years I have not noticed anything that could be regarded as toxic manifestations from the potassium. Dr. Binger brought up the question of toxic manifestations at 50 mg. I have only a few patients that have reached a level of 35 mg. per hundred cubic centimeters in the blood. At that level there was some evidence of drying of the skin, and dehydration beyond a point which we felt might be favorable. Untoward symptoms have not been seen. I think that this work of Drs. Keith and Binger

clearly establishes the diuretic efficiency of potassium nitrate and that it should dispel the fear relative to potassium administration.

Acacia in the Treatment of Nephrotic Edema

DR. ALEXIS F. HARTMANN and ANNE M. PERLEY, M.S., St. Louis: Study of the effects of acacia administered to nephrotic human subjects and to normal animals has been continued since our preliminary paper was read before this society in November 1932 and published in THE JOURNAL in January 1933. Improved methods of qualitative estimation of acacia in body tissues and fluids have increased our knowledge of the fate of this material after injection and have aided in securing effective dosage and in avoiding overdosage.

DISCUSSION

ANNE M. PERLEY, M.S., St. Louis: In our studies of ascitic and edema fluid in patients with chronic nephritis and nephrosis we have found very low protein values, usually less than 0.1 Gm. per hundred cubic centimeters. In five samples of ascitic fluid with protein concentrations between 0.03 and 0.09 Gm. per hundred cubic centimeters we found no acacia, although the serum acacia was between 0.7 and 2.0 Gm. at the time the fluids were collected. One sample of edema fluid with 0.05 Gm. of protein per hundred cubic centimeters contained no acacia when the serum had 2.0 Gm. In three samples of ascites in which we noted a slight increase in protein content, the values being from 0.23 to 0.28 Gm., we found very small amounts of acacia, about 0.05 Gm., with the serum acacia between 0.7 and 1.7 Gm. per hundred cubic centimeters. We had two samples of ascitic fluid which showed markedly increased protein values, and we found very appreciable amounts of acacia in them. In one the protein was 1.5, the acacia 0.4 and the serum acacia 1.0 Gm. per hundred cubic centimeters. In the other the protein was 1.3, the acacia 1.8 and the serum acacia 3.0 Gm. I think it can be said that acacia appears in these fluids in appreciable amounts only when the protein content is considerably increased. In our studies of the excretion of acacia by the kidney we observed that not nearly all the acacia is excreted within two or three weeks after its administration. One patient who received 90 Gm. in five days excreted 13 Gm. during this time and 15 Gm. more in the next ten days, making a total loss during the period of 31 per cent of that injected. A second patient who received 150 Gm. in five days lost only 13 per cent in fifteen days. Two other patients who received 90 Gm. in three days lost only about 13 per cent in from ten to fifteen days. A fifth patient receiving 60 Gm. in four days lost 21 per cent in twelve days. It is interesting to note that the two patients who lost the largest percentages had severe chronic nephritis; the others were diagnosed as having nephrosis. Drs. Keith, Power and Wakefield of the Mayo Clinic have pointed out that acacia persists in the blood serum for long periods after its intravenous administration. They had an opportunity to observe one patient three years after she had received acacia and found the colloid still present in the serum. Our observations confirm theirs. One patient who received 60 Gm. still had 22 mg. per hundred cubic centimeters in her serum four years and seven months later. One who received 90 Gm. had 64 mg. after one year and ten months, another who had been given 60 Gm. had 20 mg. one and a half years later, and one who received 624 Gm. nearly three years later still had 350 mg. per hundred cubic centimeters. I think these observations indicate that acacia probably reenters the blood stream very slowly from the tissues that had taken it up at the time of administration.

DR. LOUIS LEITER, Chicago: In view of the difficulties encountered both with the massive administration of acacia over a short period and the smaller individual doses given over longer periods, it should not be hard to conclude that acacia is a dangerous material to use in children with nephrotic edema.

DR. LEE FOSHAY, Cincinnati: Is there any knowledge anywhere which might point to possible deleterious effects of acacia on the pneumococcus?

DR. MELVIN W. BINGER, Rochester, Minn.: It seems to me that patients who will not respond to other diuretics may respond to acacia. My associates and I have given it to a number of patients and we have not had the good results that Dr. Hartman has had probably because we have not given it in sufficient concentration. It has to be given in sufficiently concentrated form or the desired diuretic effect is not obtained. I feel that it should not be given in all cases of edema, but only in those presenting low serum protein in which the simpler diuretics have failed.

DR. ALEXIS F. HARTMANN, St. Louis: Dr. Binger's point is well taken. We emphasized that acacia should be used only in those cases that did not respond to safer and easier methods. The red count goes down and so does the hemoglobin, but we did not observe changes in the white count. The one boy who died of pneumonia had a very high white count.

Diuretic Properties of Organic Mercurial Compounds

DRS. JOHN R. PONTIUS, LATHAN A. CRANDALL and LAURENCE E. HINES, Chicago: This is a study of the diuretic effect on edematous cardiac patients of monomercurated diallyl amide of saccharic acid, dimercurated diallyl amide of tartaric acid, monomercurated monosallylamid of gluconic acid and monomercurated diallyl amide of malic acid. By animal experiments these compounds have been shown to possess a ratio of minimum lethal dose to minimum diuretic dose that was two to three times higher than salyrgan. The diuretic response on edematous patients was unusually effective. No toxic reactions were observed in the patients studied.

DISCUSSION

DR. L. N. KATZ, Chicago: I wonder whether with these new preparations any attempt was made to find whether theophylline would further enhance the diuretic action.

DR. DON SUTTON, Chicago: Last year we used these preparations in our ward in the Cook County Hospital and in the cardiac clinic, and at no time did we observe any toxic effects.

DR. LATHAN A. CRANDALL, Chicago: In answer to Dr. Katz's question, we were unable to find any definite potentiation by the addition of theophylline in animal experiments.

DR. JOHN R. PONTIUS, Chicago: We did not try intramuscular injections. We know that any preparation of mercury given over a long period of time carries a certain element of risk, and therefore the introduction of a less toxic product should be welcomed.

Uremia from Blood Transfusion

DRS. ELMER L. DEGOWIN and HAROLD F. OSTERHAGEN and MARIE ANDERSCH, PH.D. (work begun by DR. C. W. BALDRIDGE, deceased), Iowa City: Dogs were divided into two groups, one of which was placed on a diet with an alkaline ash so that the p_H of the urine was around 8.5. The other group was placed on a diet of chopped beef mixed with 5.8 Gm. of ammonium chloride a day so that the p_H of the urine was around 6.0. Repeated transfusions of hemolyzed dog erythrocytes were given to both groups. In both groups slight or moderate nitrogen retention often occurred for several days after transfusion. The four dogs on alkaline diets all survived many transfusions. Of five dogs on acid diets, four died in uremia from four to ten days after transfusions. No dog died after a single transfusion. Autopsies were held on all dogs and the pathologic picture found in the kidneys corresponded to that described in human beings dying from transfusion anuria or from blackwater fever.

DISCUSSION

DR. CLARENCE F. G. BROWN, Chicago: As the authors intimate, there is more in this problem than meets the eye at present. They make me think back to some work done fifteen years ago by one of our emeritus members, Esmond R. Long, now of Philadelphia. He sensitized the common pig by giving it a tuberculous lesion; he then put an extract of crushed tubercle bacilli into the renal circulation and produced the same picture. Why such an apparently harmless substance as hemoglobin going into the circulation under certain conditions creates such havoc is difficult to understand. No one is as suspicious of the word allergy as I am; yet I think it must be considered here.

DR. ELMER L. DEGOWIN, Iowa City: We are not prepared to make any comment at present, in that we have not produced this condition on our first transfusion. We are working on it now.

Current Medical Literature

AMERICAN

The Association library lends periodicals to Fellows of the Association and to individual subscribers to THE JOURNAL in continental United States and Canada for a period of three days. Periodicals are available from 1925 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 12 cents if two periodicals are requested). Periodicals published by the American Medical Association are not available for lending but may be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Anatomy, Philadelphia

57: 351-546 (Nov. 15) 1935

Structure and Development of Lymphatic Tissue in Intestine of Albino Rat. Katharine Pattee Hummel, Ithaca, N. Y.—p. 351.

Observations on Changes in Blood Vascular Endothelium in Living Animal. E. R. Clark and Eleanor Linton Clark, Philadelphia.—p. 385.

Medullary and Nonmedullary Erythropoiesis, with Especial Reference to Plasma-Cell Erythrophage or Russell Body Cell, and to Erythrocatheretic (Erythrolytic) Function of Lymph Nodes and Hemal Nodes. N. A. Michels, Philadelphia.—p. 439.

Comparative Anatomic Investigation of Osseous Labyrinth (Vestibule) in Mammals. B. G. Turkewitsch, Samarkand, U. S. S. R.—p. 503.

American Review of Tuberculosis, New York

32: 617-736 (Dec.) 1935

Present Concepts of Tuberculous Infection and Disease: Their Principles and Application. E. L. Opie, New York.—p. 617.

First Infection Type Tuberculosis: Its Treatment and Prognosis. J. A. Myers, F. E. Harrington, C. A. Stewart and Marjorie Wulff, Minneapolis.—p. 631.

Outlook for Eradication of Tuberculosis. W. H. Frost, Baltimore. —p. 644.

Diabetes and Tuberculosis: I. Analysis of Eighty Cases from Standpoint of Tuberculosis. G. B. Myers and R. M. McKean, Detroit. —p. 651.

Experimental Diabetes and Tuberculosis in Dog. M. M. Steinbach, S. J. Klein and M. Deskowitz, New York.—p. 665.

Hepatic Function in Pulmonary Tuberculosis: Further Studies. J. H. Steidl and F. H. Heise, Trudeau, N. Y.—p. 677.

Cinchophen-Oxidation Test of Hepatic Function in Pulmonary Tuberculosis: Study of Its Variation. J. H. Steidl and F. H. Heise, Trudeau, N. Y.—p. 684.

*Results of Abdominal Compression in Pulmonary Tuberculosis. B. Gordon, Philadelphia.—p. 686.

Study of Excretion of Silicon in Urine of Tuberculous Patients: Discussion of Rôle of Silicon in Tuberculosis. H. Lee, Cincinnati.—p. 694.

*Nontuberculous Pulmonary Disease Simulating Tuberculosis in Children. C. W. Nissler, M. J. Sokoloff and L. Cohen, Philadelphia.—p. 702.

Calcium Metabolism and Tuberculosis. V. V. Pisani, Chicago.—p. 711.

Hetero-Allergy in Tuberculosis: Tissue Reaction of Tuberculous Animals to Pathogenic Micro-Organisms. J. Weissfeiler, U. S. S. R.—p. 719.

Glycerol-Free Medium for Tubercle Bacillus. R. R. Henley, Washington, D. C.—p. 724.

Abdominal Compression in Pulmonary Tuberculosis.—Gordon discusses the changes in the lungs of 129 patients with essentially a bilateral, fibroid type of tuberculosis, who wore special abdominal supports for from three to eighteen months. Treatment of the lungs by collapse therapy either was not indicated or had been unsuccessful. The supports were worn day and night except in extreme malnutrition, when they were removed for short periods. Compression was discontinued in certain cases for from three to five weeks to determine whether retrogression or progression occurred independently of treatment. Symptomatic relief from dyspnea and difficult expectoration was the rule. Attacks of paroxysmal tachycardia were controlled in two patients; gastro-intestinal symptoms improved in nine instances; seventy-six gained in strength and generally felt better. Roentgenograms showed improvement in the pulmonary lesions of thirty-nine patients, as evidenced by a decrease in the size of cavities or their disappearance and retrogression of the associated lesions. The supports were removed in three patients; an increase of cough followed, and in about four weeks the cavities returned to their former size. The supports were reapplied, and the cavities diminished in about five weeks. Two apical cavities, which developed during the course of artificial pneumothorax treatments, closed after the lung reexpanded and following abdominal compression. Twelve other patients showed at first a decrease in the size of their cavities, then more or less stationary dimensions; eight improved sufficiently for artificial pneumothorax to be employed safely and effectively. Twenty-six patients who showed no structural improvement in the lungs were able to exercise without untoward effects: they seemed to carry their lesions safely. The greatest symptomatic relief and improvement in the lungs occurred in the patients with the well developed abdomen and abdominal type of breathing. The unsatisfactory results, such as elevation of the temperature with increased cough and dyspnea, were noted in those with acute extensions or with soft caseating lesions and marked fibrosis. Six patients were unable to wear the supports because of gastro-intestinal manifestations or of malnutrition. While abdominal compression is not intended as a substitute for rest, diet and the recognized forms of collapse treatment, it seems reasonable to suggest its use for the chronic forms of pulmonary tuberculosis, especially in bilateral involvement, and if coughing, expectoration and dyspnea are disturbing manifestations.

Nontuberculous Pulmonary Disease.—Nissler and his associates relate the histories of three children who gave positive tuberculin reactions. The roentgen studies suggested tuberculosis. The history of long standing involvement, from two to seven years or more, with little or no appreciable changes ruled out epituberculosis, for in the latter the duration is only a few months. The three cases have been repeatedly negative for tubercle bacilli in smears from the sputum; guinea-pig inoculations have been negative, and culture studies have been negative in two cases. The sputum cultures were obtained by bronchoscopy. Two patients had cavitation over a period of years of clinical observations and roentgen studies, and there has been no spread to the other lung. The general impression is that primary infection, whether severe or not resolved, disappears or shows inconspicuous calcified areas, whereas in secondary infection the mortality rate is high, the lesions tend to spread and cavitate, the prognosis is grave and death not infrequently results. Their three cases have been contrary to all such observations as those of primary and (adult type) secondary infection of tuberculosis, and the authors are of the opinion that the lesions in the chests in the three reported cases are nontuberculous.

Annals of Surgery, Philadelphia

102: 961-1128 (Dec.) 1935

Respiratory Physiology in Thoracic Surgery. C. A. McIntosh, Montreal. —p. 961.

Surgery for Cervical Ribs. R. H. Patterson, New York.—p. 972.

*Posterior Drainage in Suppurative Pericarditis. R. L. Moore, New York.—p. 980.

Primary Carcinoma of Bronchus Treated Successfully with Surgical Diathermy. H. J. Moersch and H. H. Bowing, Rochester, Minn.—p. 989.

Carcinoma Following Gastric and Duodenal Ulcer. P. K. Sauer, New York.—p. 995.

*Jejunal Ulcer. E. S. Judd and M. T. Hoerner, Rochester, Minn. —p. 1003.

Carcinoma of Jejunum: Report of Three Cases. R. F. Carter, New York.—p. 1019.

The Surgical Diabetic: Five Year Survey. C. M. Levin and F. N. Dealy, Jamaica, N. Y.—p. 1029.

Intestinal Obstruction: Evaluation of Roentgen Diagnosis. R. A. Rendich and H. S. Abrams, Brooklyn.—p. 1040.

*Problem of Noncalculous Ureteropelvic Obstruction. A. Harris, Brooklyn.—p. 1050.

Treatment of Compound Fractures, with Especial Reference to the Orr Method. D. B. Pfeiffer and C. M. Smyth Jr., Philadelphia.—p. 1059.

Posterior Drainage in Suppurative Pericarditis.—Moore recommends a left sided, posterior approach to the pericardium as the procedure of choice for drainage of suppurative pericarditis when the pericardial infection follows a left sided empyema. The case of a boy, aged 12, who recovered after the establishment of drainage by this route, is presented, including a detailed description of the history and physical signs, operative procedure and postoperative course. The author does not believe that recovery is to be attributed solely to the site that was elected for drainage. When the boy came under his care he had recovered completely from pneumonia, the empyema cavity was closed and the general state of nutrition was good. These advantages, plus the additional fact that residual exudate accumulated posteriorly in the oblique sinus (culdesac) in spite of the posterior incision, make it impossible to evaluate exactly the part played by the posterior incision in the recovery of the patient. When the exudate became thick and it was discovered puddling in the oblique sinus behind the left atrium, the advantages to be gained from an antiseptic, solvent agent seemed to be of paramount importance, and consequently dilute solution

of sodium hypochlorite was substituted for physiologic solution of sodium chloride, which had been used up to this time. The solution accomplished its purpose, for the residual exudate disappeared rapidly after its use was begun. However, it may be too early to conclude that it did not have a harmful effect. The syndrome produced by the intrapericardial pressure presented all the typical signs of this condition. Although there was interference with the entrance of blood into the right side of the heart, 500 cc. of whole blood was added to the circulation. This was done because the boy was anemic and septic. The result was a near fatality. The experience demonstrates that an ability to recognize and interpret the signs of intrapericardial pressure is just as important from the standpoint of therapy as it is from the standpoint of diagnosis. Intravenous therapy should be cautiously withheld in these cases, and, if it is resorted to, fluid should be injected slowly and in small amounts.

Jejunal Ulcer.—Judd and Hoerner state that satisfactory results are usually obtained in cases in which the proper operation has been performed for chronic gastric and duodenal ulcer. There is considerable variation in the statistics regarding the results of surgical treatment. This is the outcome of having no standard by which the judgment and skill of the different individuals can be measured. Occasionally, failure to obtain complete relief following operation on the stomach or duodenum may be due purely to functional disorders. However, before such a conclusion is justified, the possibility of mechanical or organic factors must be entirely eliminated. When jejunal ulcer is known to exist, any one who persists in treating the lesion by medical management for a prolonged period assumes a great responsibility in view of the complications that may develop. The results of treatment of the 597 patients comprising the authors' study illustrate the value of surgical measures in cases of jejunal ulcer, for secondary procedures were required in only 6 per cent of the traced cases. The development of a jejunal ulcer suggests that the patient probably will not show a greater degree of toleration to another anastomosis between the stomach and the jejunum; therefore a radical change in the gastro-intestinal relationship is indicated and, when this is established, it must maintain the normal continuity as nearly as possible. The first operation of Billroth offers the ideal solution to the problem. It may be difficult to perform in some cases in which a considerable portion of the stomach has been removed at the primary operation; however, if the procedure can be employed, the continuity of the gastro-intestinal tract will be established in a better way than it would be by a Pólya operation. The incidence of jejunal ulcer following gastrojejunostomy for duodenal ulcer is about 2.8 per cent.

Noncalculous Ureteropelvic Obstruction. — Harris believes that the following fundamental principles of technic in all plastic operations on the pelvis assure greater safety and hope of success. 1. Following operation, a number 6 or 8 F. ureteral catheter or bougie should be passed down the ureter, brought out through the kidney and upper angle of the wound (Peck method) and left in position for from five to seven days. 2. In anastomotic procedures the pelvis should be drained through a nephrotomy wound by a 14 or 16 F. catheter for a period of five or more days. Nephrostomy is as logical in this instance as cystotomy for plastic operations on the urethra. This eliminates the effect of increased intrarenal pressure and stasis on the kidney and the suture line and meets the factor of associated infection. 3. End-to-end ureteropelvic anastomosis offers a better outlook than other methods of partial plastic repair of the outlet and is preferable to insertion of the severed ureter stump into the cavity of the pelvis. 4. The perirenal space should also be adequately drained for at least a week after operation. It is to be hoped that plastic surgery of the pelvis will prove to be more practical and useful and that errors and pitfalls may be overcome to the end that many kidneys may be saved. It would seem advantageous to have some clearing house or reference bureau to record data of all plastic work done by various operators in America, this to include continued follow-up information. Further experimental work along the line of that of Iselin appears necessary. Four histories of recent cases, illustrative of conservative operative procedures, which have resulted in complete relief of symptoms and conservation of a normally functioning kidney, are cited.

Archives of Dermatology and Syphilology, Chicago

32: 837-998 (Dec.) 1935

*Pustular Bacterids of Hands and Feet. G. C. Andrews and G. F. Machacek, New York.—p. 837.
Mapharsen ("Arsenoxide") in Therapy of Experimental Syphilis and Trypanosomiasis. O. M. Gruhzit, with assistance of W. D. Lindsay, G. Hendricks and M. C. Dodd, Detroit.—p. 848.
*Mapharsen in Treatment of Syphilis: Preliminary Report. O. H. Foerster, R. L. McIntosh, L. M. Wieder, H. R. Foerster and G. A. Cooper, Madison, Wis.—p. 868.
I. Effect of Variation of Ratios of Dextrose to Peptone on Colonies of Certain Pathogenic Fungi. J. W. Williams, Cambridge, Mass.—p. 893.
LXXI. Unusual Phenolphthalein Eruption: Report of Case. R. S. Weiss and R. L. Kile, St. Louis.—p. 915.

Pustular Bacterids of Hands and Feet.—Examination of their patients for focal infections, suggested by the blood counts, revealed many obvious foci to Andrews and Machacek. These were located chiefly in the tonsils but also in abscessed teeth. Conditions such as duodenal ulcer, chronic colitis and arthritis were of frequent occurrence. Of a total of twenty-four patients, nine have been entirely cured by tonsillectomy. In three other cases, reported by Barber, there was rapid improvement after tonsillectomy, and the only remains of the cutaneous condition were slight traces of scaliness, which caused no inconvenience. In one of the authors' patients, in whom there was some doubt as to the relationship of the tonsils to the cutaneous condition, suction of the tonsils was carried out repeatedly. After each treatment by suction the cutaneous eruption improved. When suction was not performed, the eruption grew worse. Finally the tonsils were removed, and within two weeks there was a complete cure, which has lasted nearly two years. Certain facts regarding their cases of recalcitrant pustular eruptions of the palms and soles have been established: (1) the presence of cutaneous lesions that have a proved relationship to a focus of infection, (2) positive allergic cutaneous reactions to streptococcus and staphylococcus toxins or to nucleoproteins, (3) consistently sterile cultures from the cutaneous lesions, (4) cure of the lesions by removal of the focus of infection and (5) a uniform histopathologic picture similar to that of trichophytids. With the evidence of these characteristics, the analogy of the condition to tuberculids and dermatophytids suggested the designation of bacterids as suitable and comprehensive. These pustular bacterids may resemble dermatophytosis, and the condition is often erroneously diagnosed and treated as such. In their differentiation it should be remembered that dermatophytosis chiefly affects the digits and the webs, whereas these parts are usually unaffected in cases of pustular bacterids. Fungi are not present in lesions of the latter condition.

Mapharsen in Treatment of Syphilis.—In eighteen months, Foerster and his collaborators gave 233 syphilitic persons 4,666 intravenous injections of meta-amino-para-hydroxyphenylarsine oxide (mapharsen). Included in this group were forty-one patients (given 133 injections) with nonsyphilitic conditions (psoriasis, lichen planus, Vincent's infection, hemorrhagic sarcoma of Kaposi, rat-bite fever and other disorders) and those on whom studies on the excretion of arsenic were carried out. Evidence of the pharmacologic action of the drug was shown promptly in all visible lesions. Spirochetes in open lesions disappeared on the average within twenty-four hours. Healing of visible lesions was rapid and was equal to that obtained with arsphenamine. The Wassermann reaction of the blood serum was reversed to negative in nearly all the cases of early syphilis. Return to a positive reaction occurred in one-half the cases and was found to be associated in five cases with abnormal conditions in the spinal fluid. Clinical relapse and return to positive serologic signs were observed most often after irregular or short periods of therapy during the first half year with long lapses in treatment. Nitritoid reactions did not occur. The immediate toxic reactions were chiefly mild gastrointestinal disturbances. The drug (initial dose of 25 mg.) was well tolerated by nearly all the patients in properly adjusted doses. An increase in the amount of the drug to as high as 60 mg. for each injection was well tolerated by most patients, even when given twice a week, after initial smaller doses. Jaundice developed in four cases, and accentuation of renal impairment was observed in four others. Mapharsen is a potent antisyphilitic agent and possesses special properties that justify an extensive study of this drug for a period of years.

Archives of Neurology and Psychiatry, Chicago

34: 1133-1356 (Dec.) 1935

Electro-Encephalogram in Epilepsy and in Conditions of Impaired Consciousness. F. A. Gibbs, H. Davis and W. G. Lennox, Boston.—p. 1133.

Relation Between Binet Mental Age and Motor Chronaxia. G. Kreezer and Katherine P. Bradway, Vineland, N. J.—p. 1149.

*Classification of School Children by Means of Handwriting Speed Factor. C. Quinan, San Francisco.—p. 1172.

Cerebrospinal Fluid in Cases of Tumors of the Brain. H. H. Merritt, Boston.—p. 1175.

Pathways for Pupillary Constriction: Location of Synapses in Path for Pupillary Light Reflex and of Constrictor Fibers of Cortical Origin. W. K. Hare, H. W. Magoun and S. W. Ranson, Chicago.—p. 1188.

Fibers of Pupillary Reflex and Argyll Robertson Pupil. W. Harris, London, England.—p. 1195.

Spontaneous Pain and Other Subjective Sensory Disturbances: Clinicopathologic Study. C. Davison and W. Schick, New York.—p. 1204.

Effects of Total Removal of Cerebral Cortex. F. A. Mettler, Cecilia C. Mettler, Augusta, Ga., and E. Culler, Urbana, Ill., with assistance of E. Girden and S. Eppstein.—p. 1238.

*Mesencephalic Glioma: Clinical and Pathologic Analysis of Ten Cases. B. J. Alpers, Philadelphia, and J. W. Watts, Washington, D. C.—p. 1250.

Ruptured Cerebral Varices. L. L. Tureen, S. H. Gray and P. Wheeler, St. Louis.—p. 1274.

*Multiple Sclerosis: Effect of Typhoid Vaccine and of Epinephrine on Coagulation of Blood. B. Simon and P. Solomon, Boston.—p. 1286.

Classification of School Children by Handwriting Speed Factor.—Quinan describes the results obtained in timed experiments in writing made with 100 orphan girls from 8 to 17 years of age. The mean speed values noted from the second year of grammar school to the third year of high school diminished by steplike degrees from 232 seconds to forty-three seconds. The mean value for adults, 48.6 seconds, was reached only by the high school pupils and, as a rule, girls from 15 to 17 years of age. The grade values tended to form an inverse sequence; this circumstance suggested the existence of a correlation between the factors of handwriting speed and intelligence.

Mesencephalic Glioma.—In reviewing the syndromes associated with tumors of the mesencephalon, Alpers and Watts noted that there is no constellation of signs and symptoms which can be said to be present in all cases of tumor in this region, undoubtedly owing to the many structures in this portion of the brain, the clinical features of the case depending on the number of structures invaded and the degree of their involvement. Generally speaking, there are two groups of cases: (1) glioma involving the tectum mesencephali and (2) glioma involving the tectum, tegmentum and basis mesencephali. Despite the rather wide variation in the clinical pictures encountered in cases of mesencephalic glioma, it is possible to draw some practical conclusions. First, it is certain that the diagnosis of a tumor involving the tectum mesencephali is most uncertain clinically and depends in the last analysis on injection of air. In cases of more extensive glioma involving the tectum and tegmentum or the tectum, tegmentum and basis mesencephali, there is a combination of signs of involvement of cranial nerves (chiefly oculomotor) and of the cerebellum and motor and sensory disturbances. Occasionally a syndrome simulating that of occlusion of the superior cerebellar artery is encountered. Choked disk may be present, though almost as frequently it is absent, and subjective signs of increased pressure are often pronounced. In rare instances a pupil simulating the Argyll Robertson pupil may be encountered. It should be emphasized, however, that the pupillary reactions are not those of the typical Argyll Robertson pupil, for there is loss of response both to light and in accommodation and sometimes even to consensual stimulation. The course in these cases is steadily downward despite operative intervention. The removal of the tumor is impossible, for it would necessitate removal of most of the brain stem at the involved level.

Multiple Sclerosis.—Simon and Solomon studied the clotting time of the blood in twelve patients with multiple sclerosis and in fourteen control patients with reference to the changes produced by the intravenous injection of typhoid vaccine and by the subcutaneous injection of epinephrine. The results suggest that there may be an abnormality in the coagulation of the blood in some patients with multiple sclerosis. This abnormality apparently consists in an increased lability of the clotting time, as a result of which such influences as typhoid vaccine and epinephrine produce more marked and more prolonged changes than in control patients. Such an abnormality would make clearly for an increased tendency toward intravascular clotting and would lend support to Putnam's observations on the pathology of the disease. The various factors associated with the onset or exacerbation of the symptoms of multiple sclerosis are known to be associated also with either an increased rapidity of coagulation of the blood or an increased secretion of epinephrine, which in turn causes increased rapidity of coagulation. Further work is now in progress involving the study of the blood platelets and chemical analysis of the blood, with especial reference to the elements entering into coagulation.

Arkansas Medical Society Journal, Fort Smith

32: 107-118 (Dec.) 1935

Use and Abuse of Digitalis. A. G. Sullivan, Hot Springs National Park.—p. 107.

Bandl's Ring. E. H. White, Little Rock.—p. 109.

Indiana State Medical Assn. Journal, Indianapolis

28: 639-704 (Dec. 1) 1935

Cesarean Section. N. F. Miller, Ann Arbor, Mich.—p. 639.

The Practical Management of Cardiovascular Emergencies. E. F. Horine, Louisville, Ky.—p. 642.

Problems of Senile Cataract. S. R. Gifford, Chicago.—p. 647.

Inhalation Anesthesia; Newer Developments. R. M. Waters, Madison, Wis.—p. 650.

Recognition and Treatment of Bowel Obstruction. W. D. Gatch, Indianapolis.—p. 655.

Bladder Tumor. C. J. Cooney, Fort Wayne.—p. 658.

*Improved Hypnotic and Sedative Due to Synergistic Action of Calcium with Phenobarbital: Preliminary Report. C. C. Robinson, East Chicago.—p. 662.

Acute Mercurial Poisoning Treated by Use of Sodium Thiosulfate: Case Report. H. N. Middleton, Indianapolis.—p. 662.

Improved Sedative Due to Synergistic Action of Calcium with Phenobarbital.—Robinson divided forty consecutive traumatic cases in which hypnosis or sedation were required into two groups. Every other patient was given 1½ grains (0.1 Gm.) of phenobarbital and 5 grains (0.3 Gm.) of acetylsalicylic acid. The alternate patients were given the same combination with the addition of 2 grains (0.13 Gm.) of calcium phosphate. The combination that included calcium phosphate exerted an earlier and more uniform action as compared with the combination of phenobarbital and acetylsalicylic acid when given alone. There was little difference in the cases in which large and small doses of calcium phosphate (ranging from 0.13 to 0.65 Gm.) were used. Equally favorable results were obtained with dicalcium phosphate, which has practically no action on the alkalinity of the intestine as compared with tricalcium phosphate, which is antiacid. In view of this it seems preferable to use dicalcium phosphate instead of tricalcium phosphate in order to avoid any possible decomposition of the acetylsalicylic acid.

Journal of Experimental Medicine, New York

62: 733-874 (Dec. 1) 1935

*Serologic Evidence of Immunity with Coexisting Sensitization in Type of Human Allergy (Hay Fever). R. A. Cooke, J. H. Barnard, S. Hebald and A. Stull, New York.—p. 733.

Cellular Reactions to Waxlike Materials from Acid-Fast Bacteria: Unsaponifiable Fraction from Tubercle Bacillus, Strain H-37. F. R. Sabin, K. C. Smithburn and R. M. Thomas, New York.—p. 751.

Cellular Reactions to Waxes from Mycobacterium Leprae. Florence R. Sabin, K. C. Smithburn and R. M. Thomas, New York.—p. 771.

Effects of Nasally Instilled Virus of Poliomyelitis on Cerebrospinal Fluid and Blood of Monkeys. S. Flexner, New York.—p. 787.

Further Studies on Submaxillary Gland Viruses of Rats and Guinea-Pigs. Ann G. Kuttner and T. T'Ung, Peiping, China.—p. 805.

Distribution of Swine Influenza Virus in Swine. Marion L. Orcutt and R. E. Shope, Princeton, N. J.—p. 823.

Experimental Studies on Encephalitis: IV. Specific Inactivation of Virus by Serums from Persons Exposed to Encephalitis, St. Louis Type, 1933. L. T. Webster, G. L. Fite and Anna D. Clow, with Evaluation of Results of Mouse Tests of Serums by H. Muench, New York.—p. 827.

Emigration of Pneumococci Type III from Blood into Thoracic Duct Lymph of Rabbits, and Survival of These Organisms in Lymph Following Intravenous Injection of Specific Antiserum. C. K. Drinker, J. F. Enders, M. F. Shaffer and Octa C. Leigh, Boston.—p. 849.

Serologic Evidence of Immunity.—Using ragweed hay fever as the representative of a certain type of allergy, Cooke and his associates investigated the mechanism of the protection afforded by specific injections thus far established only by

clinical observation. 1. Blood transfusions and serum injections from clinically immune, treated patients stopped the clinical reaction in untreated patients, thus indicating a transferable immunity. 2. The amount of skin sensitizing antibody in the serum was found to be practically unchanged by specific injections. 3. Injection of allergen-antibody mixtures into normal skin showed an immediate (one hour) reaction when sites were made if serum from untreated patients (serum A) was used but slight or no reaction if serum from treated patients (serum P) was used. 4. When sites made with allergen-antibody mixtures were tested after forty-eight hours, reactions were absent with serum A mixtures if enough allergen had been used but were positive with mixtures of serum P even though a much stronger allergen was contained in the mixture. 5. The primary inhibition of reactions with mixtures including serum P was not due to antihistamine effect, to binding of skin sensitizing antibody or to binding or lysis of allergen. 6. The inhibiting antibody appears to be specific. The authors interpret these serologic studies, supported by transfusion experiments, as showing the development under treatment of a peculiar blocking or inhibiting type of immune antibody that prevented the action of allergen on the sensitizing antibody and hence showed in hay fever the coexistence of sensitization and immunity.

Journal of Thoracic Surgery, St. Louis

5: 113-224 (Dec.) 1935

General Principles of Surgical Treatment of Pulmonary Tuberculosis. H. M. Davies, Ruthin, North Wales.—p. 113.
Choice of Procedure in Collapse Therapy. E. J. O'Brien, Detroit.—p. 123.
Lobectomy in Pulmonary Tuberculosis: Report of Case. S. O. Freedlander, Cleveland.—p. 132.
Esophagogastrostomy for Carcinoma of Esophagus: Report of Case. H. R. Decker, Pittsburgh.—p. 143.
Report of a "Proved Cured Case" of Squamous Cell Epithelioma of Esophagus Treated by Intraesophageal and External Irradiation. A. Crump and H. Kasabach, New York.—p. 157.
*Contributions to Technic of Pulmonary Embolectomy: Experimental Study. G. Nyström, Uppsala, Sweden, and A. Blalock, Nashville, Tenn.—p. 169.
Ewing's Tumor of the Rib: Report of Two Cases. W. P. Herbert, Asheville, N. C.—p. 189.
Studies on Volume Output of Blood from Heart in Anesthetized Dogs Before Thoracotomy and After Thoracotomy and Intermittent or Continuous Inflation of Lungs. R. L. Moore, G. H. Humphreys and W. R. Wreggit, New York.—p. 195.
*Electrocardiographic Studies of Stab Wound of the Heart. G. L. Davenport, B. Blumenthal and S. Cantril, Chicago.—p. 208.

Technic of Pulmonary Embolectomy.—Nyström and Blalock performed experiments to find a means whereby the length of time during which the vessels are occluded can be extended in the performance of the Trendelenburg operation for pulmonary embolism. The observation period following the release of the occlusion was not greater than seventeen hours in any of the studies. A resumption of the heart beats and respirations may take place in the dog after occlusion of the pulmonary artery and aorta for six minutes and fifteen seconds. If blood is introduced into the aorta between the clamp and the heart during the occlusion period, this time may be extended to nine minutes. The introduction of blood into the carotid as well may result in an extension of this period, but the results are not clear cut in this respect. When the technic of the experiments was changed in that a smaller opening was made in the pericardium and epinephrine and massage were used almost immediately following the release of the constriction, it was found that occlusion of the pulmonary artery and aorta for ten minutes and thirty seconds may be recovered from. There was, however, a sustained return of the heart beat and respirations in only four of nine experiments in which the occlusion periods ranged from five minutes and twenty seconds to ten minutes and thirty seconds. The best results were obtained in the experiments in which the pulmonary artery alone was occluded. Recovery occurred in eleven of thirteen experiments in which the occlusion periods ranged from five to twelve minutes.

Electrocardiographic Studies in Stab Wound of Heart.—Davenport and his associates present a case of stab wound of the heart requiring operative intervention. In this patient, four lead electrocardiograms were obtained. The records showed the effect of pericardial tamponade and its relief by surgery. They showed also the typical progression of changes seen in infarction in the anterior wall of the heart, in this instance produced by ligation of the left descending coronary artery and vein at operation. These electrocardiographic changes of infarction were not accompanied by clinical signs.

Kansas Medical Society Journal, Topeka

36: 485-526 (Dec.) 1935

Value of Postmortem Examinations to Clinical Medicine. C. A. Hellwig, Wichita.—p. 485.
Diverticulosis and Diverticulitis of Colon. C. C. Underwood, Cleveland.—p. 488.
Unusual Conditions Affecting Knee Joint. O. R. Brittain, Salina.—p. 492.
Chorionepithelioma. W. Cox, Wichita.—p. 495.
Therapeutic Effect of Heat as Applied with Elliott Treatment Regulator. A. J. Revell, Pittsburg.—p. 497.
*Effects of Aminopyrine and Phenobarbital on Blood Cell Count of White Rats. S. J. Wilson, Wichita.—p. 500.

Effects of Aminopyrine and Phenobarbital on Blood Count.—Wilson investigated the effect of the administration of aminopyrine, aminopyrine and phenobarbital, and phenobarbital. White rats were used because of the important differences between the blood picture of man and this animal. In the calculation of the dosage, given subcutaneously in the tissue of the back, the fact was taken into consideration that the metabolism of rats is from ten to fourteen times that of man. For each kilogram of weight, 0.05 Gm. of aminopyrine and 0.15 Gm. of phenobarbital were given. Daily injections were made for thirty-eight days. Leukocyte, erythrocyte and differential counts were made every six days on each rat. The blood for the determinations was obtained by section of the end of the tail. Aminopyrine, and aminopyrine with phenobarbital produced an increase in the leukocyte count. Phenobarbital produced no demonstrable effect on the blood picture. The leukocyte count in all the rats returned to normal by the twenty-eighth to the thirtieth day. One rat in the aminopyrine and phenobarbital series developed a rather high leukocyte count, as much as three times the normal level. A slight reduction in the erythrocyte count was observed in the same series, which later returned to normal. A few normoblasts were found in the aminopyrine and the aminopyrine and phenobarbital series on the thirtieth to the thirty-fifth day. No other changes were present in the differential counts. No changes occurred in the blood pictures of the series in which phenobarbital alone was used. The appearance of the normoblasts after intensive medication seems to indicate that the bone marrow was affected in some manner. It is possible that adequate dosage of aminopyrine, with or without phenobarbital, over a sufficient period of time, may produce leukopenia and granulocytopenia following initial leukocytosis.

Maine Medical Journal, Portland

26: 179-198 (Dec.) 1935

*Significance of the Life Course (or Level of Functional Activity) of the Chronic Arthritic. H. A. Nissen, Boston.—p. 181.
Total Removal of Both Ovaries: Transplantation of Small Ovarian Remnant: Pregnancy. E. H. Risley, Waterville.—p. 189.

Life Course in Chronic Arthritis.—In an attempt to standardize, at least roughly, the life expectancy of any arthritic patient, Nissen charted and analyzed the clinical course of 500 so-called arthritic patients. The duration of arthritic symptoms ranged from five to twenty years. Those of the group whose arthritis was of less than five years' duration (about 10 per cent of the entire number) were not included in the statistical charts. In many it is practically impossible to determine the future life course in less than a period of five years. The biographies in 100 of these cases are complete, ending in death. On the basis of these 100 dead, ten more years must elapse before the remaining 400 will be completed. A rough standard of arthritic life expectancy has been formed on the composite chart of the group, which will be modified or corroborated at the end of these ten years. In any group of so-called arthritic patients 68 per cent or more can be assured of improvement. In this study this 68 per cent is listed under the differential diagnosis of degenerative or tissue change. The remaining 32 per cent, genuine arthritic patients, constitute the problem on which the physician interested in

chronic disease, especially arthritis, should concentrate. To gain recognition and understanding of the clinical life course, yearly follow up of the arthritic patient is required. This knowledge, if gained, will be worth the effort expended if it proves to be of definite diagnostic and prognostic value. Only in this way, in contrast to short periods of trial of innumerable forms of therapy without continuous, personal follow up of each patient, will one learn whether his stewardship has been good, bad or indifferent.

Nebraska State Medical Journal, Trenton

20: 449-484 (Dec.) 1935

Immediate Management of Compound Fractures. W. L. Sucha, Omaha. —p. 449.
Nutritional Anemia. G. E. Robertson, Omaha.—p. 452.
Recognition of Latent Hypothyroidism. J. F. Gardiner, Omaha.—p. 457.
Responsibility of Physician to Hard of Hearing. C. T. Uren, Omaha. —p. 460.
Bowel Obstruction. S. A. Campbell, Norfolk.—p. 463.
*Blood Urea Nitrogen by Direct Nesslerization. M. J. Breuer, Lincoln. —p. 464.
Self Retaining Male Catheter. R. Cohen, Grand Island.—p. 466.
Further Report on the Schiller Lugol Test of Cervix Uteri. R. J. Stearns, Omaha.—p. 467.

Blood Urea Nitrogen by Direct Nesslerization.—Breuer asserts that determining the blood urea nitrogen by direct nesslerization gives results well within the limits of accuracy required for clinical dependability. It has been used by him for six years in place of the old and vastly cumbersome aeration method, and no cause for dissatisfaction with it has ever been found. He feels that the facility of the method will encourage the performance of more nitrogen chemistry tests in laboratories in which time and effort are a major consideration. The method consists in permitting the urea-transforming enzyme to act in fresh, whole blood, precipitating the proteins after the enzyme action is finished and nesslerizing the protein filtrate. It has been found that, to secure the urease action in whole blood to the complete transformation point of the urea, a high concentration of the enzyme is necessary. This result is obtained by the utilization of a highly purified product. Urease tablets have been used almost exclusively in the author's work. In order to secure the maximal speed of reaction, a relatively high temperature is required. Neither the urease reaction nor the precipitation has been found to have any quantitative effect on the urea-nitrogen content of the blood. In his laboratory, in which the Klett colorimeter is used, the unknown is read directly against the glass nitrogen standard. The reading must be multiplied by the glass correction, 0.95, before calculation; i. e., the reading multiplied by 0.95 equals R.

New York State Journal of Medicine, New York

35: 1183-1240 (Dec. 1) 1935

Trichobezoar (Hair Cast of Stomach). C. F. Potter, Syracuse.—p. 1183.
Myasthenic Syndrome: Presentation of Case with Description and Discussion of Findings in Central Nervous System. C. A. McKendree and A. Wolf, New York.—p. 1190.
Dissecting Aneurysm of Aorta: Diagnosis and Operative Relief of Acute Arterial Obstruction Due to This Cause: Case Report. D. Gurin, Great Neck; J. W. Bulmer, Glen Cove, and R. Derby, Oyster Bay. —p. 1200.
Life Span of the Diabetic Patient: Report of Fifteen Hundred Cases, Thirteen Years After Discovery of Insulin. J. Hajek, New York. —p. 1203.
Cholecystectomy in Typhoid Carriers: Report of Five Cases. E. C. Hanssen, New York.—p. 1206.
Gonococcemia with Complete Recovery: Case Report. S. H. Kritzalis, New York.—p. 1208.
Borderline Conditions Between Medicine and Surgery. E. L. Young Jr., Boston.—p. 1211.
Novocain Pack: Contribution to Therapy of Fresh Accidental Wounds. M. Fritz and E. K. Tanner, Brooklyn.—p. 1217.

Northwest Medicine, Seattle

34: 453-492 (Dec.) 1935

Late Concepts of Peptic Ulcer Etiology: Preliminary Report of Modern Therapy. H. M. F. Behneman, San Francisco.—p. 453.
Prognosis in Chronic Arthritis. K. K. Sherwood, Kirkland, Wash. —p. 459.
Thrombo-Angiitis Obliterans (Buerger's Disease). G. E. Brown, Rochester, Minn.—p. 463.
Prevention of Late Deformity in Colles's Fracture. D. A. Murray, Seattle.—p. 467.
Goiter: Practical Points. M. S. Rosenblatt, Portland, Ore.—p. 468.

Public Health Reports, Washington, D. C.

50: 1719-1750 (Dec. 6) 1935

Studies on Minimal Threshold of Dental Sign of Chronic Endemic Fluorosis (Mottled Enamel). H. T. Dean and E. Elvove.—p. 1719.
Method for Standardization of Antipneumococcic Horse Serum and Concentrates. L. D. Felton and Helene J. Stahl.—p. 1730.

Southwestern Medicine, Phoenix, Ariz.

19: 411-444 (Dec.) 1935

The Endocrines in Gynecology. H. H. Latson, Amarillo, Texas.—p. 411.
Fundamental Principles in Grading of Malignancy of Tumors. L. Lindberg, Los Angeles.—p. 413.
Ovulation: Sterile and Fertile Periods. C. W. Anderson, Denver. —p. 421.
Prevention of Blindness Program for New Mexico. L. H. Carris, New York.—p. 425.
Prostatic Obstruction. H. C. Bumpus Jr., Pasadena, Calif.—p. 427.
Treatment of Fractures of Femur Shaft. R. G. Packard, Denver. —p. 430.
Treatment of Brain Tumors. H. V. Briesen, Los Angeles.—p. 433.
Control of Food Allergens Extremely Difficult. O. H. Brown, Phoenix, Ariz.—p. 436.

Virginia Medical Monthly, Richmond

62: 485-552 (Dec.) 1935

Significance and Diagnostic Importance of Pain as Symptom of Disease. J. E. Paullin, Atlanta, Ga.—p. 485.
*The Erythrocyte and Its Relation to Blood Pressure. H. M. Doles, Norfolk.—p. 489.
Roentgen Diagnosis of Pneumoperitoneum: Report of Case of Ruptured Duodenal Ulcer with Spontaneous Recovery. W. Clarkson and A. Barker, Petersburg.—p. 496.
Heart Block: Complete Auriculoventricular Dissociation and Intraventricular Block in Case of Rheumatic Heart Disease. P. D. Camp, Richmond.—p. 498.
The Acute Abdomen. G. C. Engel, Philadelphia.—p. 502.
Some Reflections on Scarlatina. J. H. Hiden, Pungoteague.—p. 507.
Acute Suppurative Appendicitis Complicated by Multiple Liver Abscesses: Report of Case. W. P. Barnes, Richmond.—p. 511.
Review of Eclampsia at the University of Virginia Hospital. Dorothy D. Brame, University.—p. 513.
Identification by Sinus Prints. J. Mayer, Washington, D. C.—p. 517.
The Art of Explaining Medical Matters to Our Patients. G. A. Ezekiel, Richmond.—p. 519.

The Erythrocyte and Its Relation to Blood Pressure.—Doles bases his discussion on the study of 140 patients, of whom ten were normal, 125 hypertensive and five hypotensive. Iron determinations point to the belief that cell enlargement in hypertension is due to an increased iron content of the red blood cells. Hypotension uncomplicated by cardiac impairment is the result of the loss of red blood cells through anemia or a microcytosis. If microcytosis is present, it is due to a lack of iron content. Therefore hypotension may be the result of an anemia with or without microcytosis or microcytosis without an anemia or the two combined. Blood pressure in cases of severe nephritis will vary from the actual blood pressure obtained by the blood observations, but a definite determination of the pressure produced in kidney damage can be estimated by subtracting the actual pressure by blood observations from the instrument pressure. The treated cases in which results were obtained showed an increase in the red cells and a decrease in the cell size, hemoglobin, iron content of the cells, plasma and urine, with a corresponding fall in systolic and diastolic blood pressure. All cases reported with the exception of three showed marked benefits by reduction in the size of the red blood cell. The two cases of nephritis still show some elevation of pressure; one uncomplicated case has failed to respond to treatment. One case has been reported in which a denervation was done in an attempt to reduce pressure. There was a loss of about 20 points of blood pressure. This man had some anemia, which probably was the result of the reduction in pressure as well as the denervation. The author does not wish to convey the idea that arteriosclerosis and nephritis do not play a part in hypertension, but that the enlargement of the red blood cells is the one most common cause, a factor heretofore not considered. In the treatment of these cases the two essential points are to reduce the red cells to normal size and to increase the number of red cells if an anemia of any degree is present. The diet will have to be changed from time to time in all probability, and yet some other factor, unknown at present, may be found that will influence the red cells. The liver may play its part.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Ophthalmology, London

19: 641-704 (Dec.) 1935

Congenital Retinal Fold. Ida Mann.—p. 641.
A Tick on the Upper Eyelid. E. O. Kirwan.—p. 659.
Red Multiple Maddox Rod with Prism. C. Berens.—p. 661.
Phospholipid Content of Cataractous Human Lenses. P. W. Salit.—p. 663.
Recurrent Vision with Moving Stimulus of Alternating Intensity. F. L. Warburton.—p. 672.

Glasgow Medical Journal

6: 225-264 (Nov.) 1935

Some Recollections on Asthma, with a Few Suggestions as to Its Treatment in Childhood. W. D. Allan.—p. 225.

Journal of Physiology, London

85: 277-420 (Nov. 22) 1935

Muscular Force at Different Speeds of Shortening. W. O. Fenn and B. S. Marsh.—p. 277.
Chemical Transmitter of Sympathetic Nerve to Uterus. M. A. F. Sherif.—p. 298.
Response of Chemical Receptors of Carotid Sinus to Tension of Carbon Dioxide in Arterial Blood in Cat. A. Samaan and G. Stella.—p. 309.
Estimation of Estrin and of Male Hormone in Oily Solution. Edith Bülbring and J. H. Burn.—p. 320.
Action of Adrenalin on Respiratory Quotient. E. M. Bridge and H. R. Noltie.—p. 334.
Effect of Choline on Weights of Young Rats. E. W. McHenry.—p. 343.
Response of Vagotomized Animals to Respiratory Resistance. M. Tiitso.—p. 350.
Choline and Liver Respiration. O. A. Trowell.—p. 356.
*Blood Flow Through Skeletal Muscle in Relation to Its Contraction. G. V. Anrep and E. von Saalfeld.—p. 375.
Alleged Occurrence of "Krampfstoffe" in Acetone Extracts of Mammalian Brain. E. Holmes.—p. 400.
Appearance of Histamine in Venous Blood During Muscular Contraction. G. V. Anrep and G. S. Barsoum.—p. 409.

Blood Flow Through Skeletal Muscle.—Anrep and von Saalfeld observed that a comparison of the venous outflow and of the arterial inflow of blood into a contracting skeletal muscle shows that muscular contraction is accompanied by a compression of the intramuscular blood vessels. The suggestion made by Rein that the blood vessels of a muscle present a diminished resistance to the blood flow during contraction cannot be confirmed. The compression of the blood vessels by the contracting muscle depends on the strength of its contraction and not on the character of its contraction—isometric or isotonic. The vasodilatation following the contraction also depends on its strength; that is, on the number of muscle fibers participating in the contraction. Potent vasodilator substances appear in the venous blood emerging from a contracting muscle. These substances are stable in blood at least up to half an hour. A most conspicuous hyperemia is observed when the venous blood collected during activity of the muscle is reperfused through it. The theory of Rein that the vasodilator substances are not released from the muscle fibers until the moment of their relaxation finds no support in the authors' experiments. The vasodilator substances are produced and released from the muscle during its contraction. The liberation of these substances continues for some time following the relaxation; how far their production also outlasts the period of contraction cannot as yet be ascertained. Indirect evidence indicates that the vasodilatation following muscular contraction is not directly due to changes in the gaseous content of the blood.

Lancet, London

2: 1101-1154 (Nov. 16) 1935

Pharmacologic Aspect of Digitalis Therapy. A. Fraenkel.—p. 1101.
Obstetric Practice of the Future. M. H. Phillips.—p. 1107.
Cyclopropane Anesthesia: Report Based on Two Hundred and Fifty Cases. S. Rowbotham, in association with Aileen Chester, R. Jarman, G. R. Phillips and T. B. Vaile.—p. 1110.
*Whooping Cough: Diagnostic Significance of Blood Counts. N. D. Begg and Margaret F. Coveney.—p. 1113.
*Resection for Carcinoma of Sigmoid and Sigmoid Rectum. D. P. MacGuire.—p. 1114.

Blood Counts in Whooping Cough.—Begg and Coveney discuss the blood count observations in sixty-five cases of whooping cough. Most of these were in the late paroxysmal or early whooping stage of the disease and ages ranged from 3 months to 9 years. Blood counts, which consisted of a total and differential leukocyte count, were performed at two stages in the disease—on admission and in early convalescence. The figures obtained were then compared with Still's table and the results expressed as plus or minus normal for the particular age group. An absolute increase in the number of leukocytes was present in every case; increases amounting to more than 30,000 were occasionally obtained. On an average, each case was shown to have 10,064 leukocytes more than was normal for the age. Lymphocytosis characterized some 77 per cent of cases, and in 35 per cent this change was marked. On the other hand, as many as 23 per cent showed no increase at all. In the age group of less than 6 months only 17 per cent of children showed a marked lymphocyte increase and no less than 33 per cent showed no increase. No other significant difference between the various age groups was detected. By the fourteenth day of the whooping stage, the leukocyte count had returned to physiologic limits. This was equally true whether the initial lymphocytosis had been marked, moderate or mild.

Resection for Carcinoma of Sigmoid.—MacGuire feels that the most aseptic method for the removal of carcinoma of the sigmoid and sigmoid rectum is the following: In the first stages the cecum is withdrawn through a McBurney incision and anchored there for forty-eight hours. This can be done by applying a clamp to the mesentery of the appendix or suturing the parietal peritoneum to the mesentery, care being taken that at no time is a needle inserted in the colon proper for fear of infection. A Paul tube is then introduced after forty-eight hours and a suction apparatus of the Wangensteen type is connected. Up to 5,000 cc. of a 5 per cent solution of dextrose and physiologic solution of sodium chloride is given by intravenous injection and also by clysis during the first few days. Blood transfusions are ordered as the need arises. When the condition of the patient warrants it, he is sent home for a rest of two months before the radical abdominoperineal operation is performed. On return to the hospital, a complete check up is made. The administrations of transfusions, dextrose and sodium chloride solution, and also the application of an indwelling catheter are ordered. A median or left incision is now made and the mesentery of the left colon is resected from a point above the growth down through the peritoneal reflection, the gland bearing area being excised. The abdomen is closed temporarily and the patient is placed in the lithotomy position for perineal resection. The anal areas are painted with iodine, and gauze soaked in iodine is introduced into the rectum. The aperture is then closed with a continuous suture so that more iodoform gauze can be applied to the lower segment and this, in turn, is enveloped in a sterile rubber glove. The perineal incision is made preferably with a cautery and continued until sufficient rectum extrudes. A second sterile glove completely envelops the lower intestinal segment. After dissection up to the peritoneal reflection, the abdomen is reentered, the peritoneal reflection is dissected and the entire loop is drawn upward into the abdominal cavity. It is then carried through a separate incision made through the left rectus muscle for the purpose of fashioning a single-barrel colostomy. The peritoneal reflection is closed; the cut edges of the sigmoid mesentery are sutured to the left parietal peritoneum to prevent herniation, and the incision in the abdomen is also closed in the usual manner. The extraneous intestine is double-clamped a few inches from the colostomy opening and severed with a cautery. Postoperatively the patients are made comfortable by the use of morphine, and 4,500 cc. of the dextrose and sodium chloride solution is given by hypodermic clysis or intravenously for the first few days. An indwelling catheter is used and irrigations of boric acid are given for at least one week after operation. Repeated blood transfusions are given as indicated by the condition of the patient.

South African Medical Journal, Cape Town

9: 777-816 (Nov. 23) 1935

Our Land: Is Our Population Satisfactory? Climate and Clothing in South Africa. G. A. P. Ross.—p. 779.
Id.: Climate in South Africa. H. P. Smit.—p. 782.
Hemophilia. S. Zavadier.—p. 789.
The Blindness of John Milton. D. J. Wood.—p. 791.

Bruxelles-Médical, Brussels

16: 114-148 (Nov. 24) 1935

Action of Foods on Endocrine Sympathetic System. N. Pende.—p. 114.
What is Best Treatment of Acute Gonorrhea? E. Tant.—p. 118.
*Cutaneous Staphylococcic Infections and Their Treatment by Copper Sulfate. J. Hannecart.—p. 121.
Is Forced Labor a Lost Procedure? P. Pastiels.—p. 126.

Treatment of Cutaneous Staphylococcic Infections.—Staphylococci, according to Hannecart, have a marked predilection for the pilosebaceous follicles because of their relatively constant temperature, moisture and richness in organic débris. Since infections of these regions with staphylococci have a tendency to spontaneous recovery, treatment is difficult to evaluate. There are cases, however, that do not heal spontaneously and are resistant to the usual forms of therapy. For this group the author has employed copper sulfate administered intravenously in a 0.5 per cent solution, orally in keratinized 0.02 Gm. pills, and locally in a 1 to 10,000 lotion and in ointments composed of one part of copper to two parts of camphor and ninety-seven of simple base. The intravenous injection of one ampule (10 cc.) is made daily until improvement is marked. Thereafter it is given every other day. In children aged from 8 to 10, only 5 cc. is given. The usual result of treatment is a rapid diminution of pain and an active disappearance of the core. In general, ten days is enough to produce convalescence in furunculosis that has been resistant to all other treatments. It does not, however, always prevent recurrences, although when these occur a few further days of treatment is usually sufficient. The mode of action is not clear. The copper is eliminated largely in the bile. The results are particularly good with isolated furuncles and often gratifying in generalized furunculosis, furuncles of the auditory canal and anthrax. In acne, good results have not been obtained.

Gynécologie, Paris

34: 601-664 (Oct.) 1935

Periodic Infertility of Woman. G. Cotte.—p. 601.
Studies of Action of Some Hormones on Plants. G. Cotte, P. Manceau and Claire Meyer.—p. 612.
Anogenital Pruritus Resistant to Surgical Treatment: Three Cases. G. Cotte and J. Gaté.—p. 624.
*Treatment of Chronic Cervical Metritis by Electrocoagulation. G. Cotte.—p. 630.
*Preventive Treatment of Phlebitis of Legs in Gynecologic Operations. G. Cotte and N. Boulez.—p. 634.
Diffuse Endometriosis of Uterine Body. G. Cotte.—p. 639.
Recurrence in Uterine Body of Cervical Neoplasm Treated with Radium Three Years Previously. G. Cotte and R. Sprecher.—p. 643.

Treatment of Cervical Metritis by Electrocoagulation.—Cotte states that he has employed this method of treatment for ten years. The technic varied according to the case. In exocervicitis with erosion it was necessary to insert the needle only 2 or 3 mm. past the cervix. Following the treatment, mercurochrome was used and the patient treated again, if necessary, in three or four weeks. In endocervicitis the technic is more difficult. He used a small intracervical fenestrated speculum. The cervix was fixed and the speculum introduced and turned so that fulguration of each involved area could be performed. In light cases one session was usually enough, but in severe ones more were necessary. He has never observed the slightest accident or complication from these treatments. The results have been excellent. Thus, of the thirty-six patients so treated in 1932, all of whom recovered, seven had one pregnancy and two had two pregnancies subsequent to the treatment.

Prevention of Phlebitis in Gynecologic Operations.—Since phlebitis involving the saphenous veins is the most common complication of gynecologic operations, Cotte and Boulez discuss the possibilities of preliminary preventive treatment. In two cases they practiced surgical section of the saphenous vein at its upper anastomosis and at the same time injected from 20 to 30 cc. of a 30 per cent solution of sodium salicylate at its peripheral end. In these two cases the results were excellent and no postoperative phlebitis occurred. While it is impossible to say that phlebitis would have occurred if this procedure had not been performed, the preliminary operation is simple and may help in avoiding this painful complication, especially in persons with deficient circulation.

Schweizerische medizinische Wochenschrift, Basel

65: 1157-1196 (Dec. 7) 1935. Partial Index

Scientific Foundation of Goiter Prophylaxis. F. de Quervain.—p. 1157.
Arrangement of Digitalis Treatments. L. Krehl.—p. 1161.
Biochemical Affinity of Cardiant Glucosides for Cardiac Muscle. E. Rothlin.—p. 1162.
Prophylactic Treatment of Arterial Atheroma. C. I. Parhon and J. Ornstein.—p. 1164.
*Percutaneous Administration of Estrogenic Substance. B. Zondek.—p. 1168.
*Some Observations on Possibility of Influencing Psoriasis by Cevitamic Acid. W. Lutz.—p. 1169.

Percutaneous Administration of Estrogenic Substance.—Zondek shows that estrogenic substance is active not only in subcutaneous, oral and rectal administration but also when given percutaneously. In experiments on male guinea-pigs he found that the region of the mammary gland is especially susceptible to estrogenic substance, for embrocation with ointment resulted in enlargement of the mammary gland of male animals in a comparatively short time, and continuation of the embrocations even elicited lactation. Another typical reaction was hyperpigmentation of the mammary areola, corresponding in intensity to that of the pregnant female animal. Moreover, the percutaneous administration also exerted an antimasculine effect, in that the testes decreased in size. In view of the fact that estrogenic substance is absorbed by the skin and that in the case of some organs, such as the mammary glands, it is more effective than the subcutaneous administration, the author decided to try the percutaneous administration in disorders such as pruritus vulvae senilis. In six cases refractory to other methods of treatment, the itching areas were massaged twice daily with an estrogenic ointment and favorable results were obtained in five cases. The author tried the percutaneous treatment also in acne vulgaris of young girls and of menopausal women. He concedes that not all cases responded to this treatment but says that it proved surprisingly effective in some refractory cases. He applied the ointment to the face of these patients, at first once and later twice a day. He suggests that the ointment might also be tried in articular disorders in which hormones play a part.

Cevitamic Acid in Psoriasis.—Lutz points out that it becomes more and more evident that psoriasis is a metabolic problem and that it can be influenced by way of the metabolism. He reports three cases of psoriasis vulgaris in which he obtained favorable results with the oral administration of cevitamic acid. The acid was given in the form of tablets, each containing 0.05 Gm., and in the form of powders, each containing 0.25 Gm. of cevitamic acid. The daily doses varied: in one case it was gradually increased to three tablets four times a day. In addition to the three cases in which the cevitamic acid proved effective, the author observed a number of cases in which the treatment was of slight or no effect. However, these patients received only ambulatory treatment, and he thinks that the medication might not have been sufficiently regular to achieve its object; moreover, he admits that in view of the complex etiology of psoriasis it cannot be expected that all cases respond to this treatment. Even in the three patients who at first responded favorably to the treatment, the results were not lasting. He reaches the conclusion that cevitamic acid is not the method of choice in the treatment of psoriasis but thinks that the possibility of influencing some cases justifies further therapeutic trials.

Tuberculosi, Rome

27: 351-390 (Oct.) 1935

*Treatment of Tuberculous Empyema by Double Gold and Sodium Thiosulfate by Intrapleural Route. L. Roccas.—p. 351.

Treatment of Tuberculous Empyema.—In the treatment of tuberculous empyema, Roccas advises intrapleural injections of double gold and sodium thiosulfate, starting with 0.05 Gm. dissolved in 10 cc. of distilled water and increasing the dose 0.05 Gm. per injection until 0.3 Gm. per injection is administered. The injections are given at intervals of four, five or eight days, according to the rate of clarification of the pleural fluid and the tolerance of the patient to the treatment. Fever appears in some cases and lasts for one or two days. No severe reactions follow the treatment. Doses of 0.5 or 0.6 Gm. of double gold and sodium thiosulfate per injection makes the

vigilance of the patient necessary, especially for the possible appearance of eosinophilia or urinary disturbances as complications. The treatment is of complemental value to intrapleural lavage. Its results are better in pure tuberculous pyopneumothorax than when associated with other bacteria. In the latter cases a combined treatment of intrapleural injections of vaccines and of double gold and sodium thiosulfate gives satisfactory results and the improvement of the patients is more effective and rapid than that obtained by intrapleural lavage alone. The character of the pleural fluid is favorably modified by the second or the third month of the treatment. In some cases sclerosis of the tuberculous pulmonary foci is rapidly produced. This fact seems to indicate a possible action of the gold treatment as complemental to an insufficient artifical pneumothorax. Satisfactory results from the treatment are reported by the author in nine cases of tuberculous pyopneumothorax complicating artificial pneumothorax. In his cases he used either a chlorophyll preparation (chlorosan) or physiologic solution of sodium chloride as liquid for the lavage. Lavage was stopped at each treatment as soon as the returning liquid was clear and discontinued altogether as soon as the character of the pleural fluid was favorably modified. In the latter case the last part of the treatment consisted only of a few more injections of double gold and sodium thiosulfate.

Prensa Médica Argentina, Buenos Aires

22: 2293-2340 (Nov. 27) 1935. Partial Index

Parathyroprival Tetany-Epilepsy: Case. J. J. Beretervide, C. F. Cárrega Casaffousth and S. Rosenblatt.—p. 2293.
Biopsy: Its Technic and Indications. D. Brachetto-Brian.—p. 2297.
*Frequency, Clinical Forms and Diagnosis of Hyperthyroid Diarrhea. A. Richieri.—p. 2317.
Stercoroma. J. L. A. Mulcahy.—p. 2327.
Cutaneous Syphilis Following Trauma: Case. J. L. Carrera.—p. 2330.

Diarrhea of Hyperthyroid Origin.—Richieri states that diarrhea is frequent in all forms of hyperthyroidism and may be the predominant or even the only symptom of the condition. Hyperthyroid diarrhea has a sudden onset. The number of bowel movements varies between two and three a day in the mild forms and between forty and fifty in the acute. The bowel discharges are of a paroxysmal type and sometimes painful. The feces, which are either loose or soft and have neither mucus nor blood, which proves the lack of infiltration of the intestinal mucosa, show no characteristic tendencies on microscopic examination. The diagnosis of hyperthyroidism is difficult in atypical forms in which the goiter cannot be felt, exophthalmos does not exist, tremor does not show itself or is not intense and tachycardia may be present. It is also difficult in undeveloped but impending hyperthyroidism (Pende's type of minimal hyperthyroid constitution). Lymphocytosis and the results of Lowi's epinephrine test and of other methods for the diagnosis of hyperthyroidism are of no value. A certain diagnosis may be made in these cases, however, by determining the basal metabolism, an increase of which as well as the presence of alimentary hyperglycemia points out the hyperactivity of the thyroid as the cause of diarrhea. The author reports nine cases of hyperthyroid diarrhea.

Deutsche medizinische Wochenschrift, Leipzig

61: 1911-1950 (Nov. 29) 1935. Partial Index

*Two Years' Clinical Experiences with Conditioned Free Diet in Treatment of Diabetes Mellitus. B. W. Ercklentz.—p. 1911.
*Insular Emaciation. B. Liegner.—p. 1916.
Utilization of Hardened Fats in Human Metabolism. C. Massatsch and H. Steudel.—p. 1918.
Institutional Treatment of Diabetes. A. Kemen.—p. 1919.
Gout and Related Conditions. H. Sauerwald.—p. 1921.

Experiences with Conditioned Free Diet in Diabetes Mellitus.—Ercklentz reports his results with a somewhat modified form of Stolte's "free diet." A diabetic patient who comes to the clinic while he is not in coma is given on two succeeding days 1 liter of milk and 48 Gm. of carbohydrates, 35 Gm. of fat and 32 Gm. of protein (in all 672 calories). With this regimen the patient's condition improves rapidly, he feels better, and the thirst and polyphagia are reduced. The glycosuria, hyperglycemia and acetonuria become lessened. If after the milk days the acetonuria has disappeared, the patient is given no carbohydrates for a day, but if this is not the case a mixed diet is instituted at once. The patient's reaction to the milk days indicates also whether the diabetes is mild or severe and with this the later insulin requirements. If there is no great glycosuria and if the blood sugar is low, insulin can be dispensed with and a dietetic treatment may be continued. In the beginning the mixed diet consists of from 1 to 2 Gm. of carbohydrates and from 1 to 1.5 Gm. of protein per kilogram of body weight and at the most 70 Gm. of fat, so that the calories total about 1,500. If the patient eliminates sugar under these conditions, he receives insulin, the quantity of which depends on the amount of sugar that he eliminates. As soon as aglycosuria has been obtained, the patient is given a conditioned free diet in which the patient's wishes, particularly his wishes for carbohydrates, are considered, whereas protein and fats are kept within the limits mentioned. The demands for carbohydrates are often considerable during this period (300 Gm. and more). The urine is tested before each meal and the intended quantity of insulin is increased by 5 units if the test is strongly positive and by 2 units if it is weakly positive. If the test is negative, the insulin dosage may eventually be slightly reduced. Considerable increase in the carbohydrate intake usually necessitates a corresponding increase in the insulin dosage but, after a while, the carbohydrate hunger usually diminishes and the insulin dosage must be carefully reduced so as to avoid hypoglycemic reactions. The present requirements become the basis for the permanent treatment, which, although more or less free, must nevertheless be a dietetic one. Overfeeding should be avoided, and the patient should remain under the physician's control.

Insular Emaciation.—Liegner emphasizes that hypofunction of the insular apparatus of the pancreas does not always lead to diabetes. He demonstrated in animals that, if the pancreatic substance is considerably reduced, emaciation may result. Insular emaciation occurs almost exclusively in women, a fact that has not been explained. Studies convinced him that the female is more accustomed to metabolic fluctuations than is the male and that the male reacts to disturbances in the insular apparatus of the pancreas somewhat differently from the female. Since diabetes is three times as frequent in men as in women, the author thinks that it may be assumed that hypo-insulinism predisposes the man to diabetes and the woman to emaciation. He concedes that hypo-insulinism, which is not a diabetes but rather becomes manifest as an emaciation, may be accompanied by disturbances of other endocrine organs, particularly the ovaries and the hypophysis, but he insists that it is nevertheless a clearly defined disease entity. In discussing the therapy of this form of emaciation, he points out that these patients are extremely sensitive to insulin. He thinks that medication should be begun with 5 units and that a single dose of 20 units should be maximal for these patients. Moreover, the small doses should not be given more than three times a day. A single insulin cure is as a rule not sufficient, but the author as well as others have gained the impression that intermittent treatment is advisable. In this manner it is possible to compensate not only the insular defect but also the other endocrine disturbances.

Medizinische Klinik, Berlin

31: 1593-1624 (Dec. 6) 1935. Partial Index

*Pathogenesis, Symptomatology and Glandular Therapy of Angioneurotic Disturbances. O. Klein and A. Schally.—p. 1599.
*Results of Blood Transfusions in Malignant Diphtheria. H. Seckel.—p. 1603.
*Rôle of Curvature of Spine in Pathogenesis of Gastroduodenal Ulcer. I. Pines.—p. 1610.
Preservation of Individuality of Mother and Child During Pregnancy. O. Grosser.—p. 1611.

Angioneurotic Disturbances.—Klein and Schally point out that the symptomatology of angioneurosis varies greatly. In some patients the disorders of the central nervous system predominate (visual disturbances, headaches, migraine, tinnitus aurium, vertigo and so on), in others the cutaneous symptoms (paresthesias, pallor, acrocyanosis) are noteworthy and still others complain of disturbances in the gastro-intestinal tract. In discussing the nature of these disturbances he emphasizes the dysregulation of the blood perfusion in the region of the small vessels. The tonus of these small vessels, which determines their blood perfusion, is controlled by the sympathetic nervous system as well as by endocrine factors. The author reports the history of a case of angioneurosis characterized by

cutis marmorata and by transitory disturbances of the central nervous system. The spotting of the skin was the result of red and livid areas that showed a strong contrast to the surrounding pale skin. Examination with the capillary microscope revealed capillary atony. The author resorted to subcutaneous injection of solution of posterior pituitary and found that this extract counteracted not only the objective manifestations of the central nervous system and the cutis marmorata but also the subjective complaints. When the treatment with the extract was discontinued for some time, the subjective and objective symptoms reappeared, but renewed treatment counteracted them again. This and the capillary atony make it probable that a deficiency of posterior pituitary hormone is at least partly responsible for the pathogenesis of the disorder, in spite of the fact that the clinical and roentgenologic examination failed to reveal anatomic changes in the hypophysis.

Blood Transfusion in Diphtheria.—Seckel emphasizes that blood transfusion in malignant diphtheria is an auxiliary therapeutic measure; that is, it is never employed without the customary serotherapy. Immediately after admittance to the hospital, his patients were given serum by intramuscular injection and occasionally also by intravenous injection. The blood transfusions were usually given on the same day on which the main dose of serum was given. The quantity of blood varied between 300 and 400 cc.; that is, approximately 15 cc. for each kilogram of body weight. The blood was furnished by suitable blood relations of the patients or by professional donors belonging to blood group O. The specific antitoxin content and the diphtheria anamnesis of the donors were disregarded. The author resorted to blood transfusion only in the severe, so-called malignant cases of toxic diphtheria, which are characterized by extensive coating and edema of the pharynx, disfiguring periglandular edemas along the entire neck and even on the chest, serosanguineous discharge from the nose, eventually hemorrhages, and severe disturbances of the general condition with pallor, vomiting, apathy, jactitation and so on. After blood transfusions on the sixth and eighth days proved ineffective, the author resorted to transfusion only within the first five days and usually within the first four days. The results of the auxiliary blood transfusion in forty-two cases are recorded in a table. It was found that whereas the lethality of the malignant form of toxic diphtheria had before been approximately 80 per cent, it was now only about 40 per cent. The severely disturbed general condition of the patients was favorably influenced. Moreover, myocarditis was either prevented or took a much milder course, and the late fatalities resulting from respiratory paralysis were almost entirely prevented. The author considers auxiliary blood transfusion the most important progress in the treatment of diphtheria since the introduction of serotherapy.

Rôle of Curvature of Spine in Gastroduodenal Ulcer.—Pines says that three theories of the pathogenesis of gastroduodenal ulcers have found widest acceptance: the neurospasmogenic, the mechanic-functional and the gastritic. Each of these theories will doubtlessly explain a certain number of cases of ulcer, but he thinks that in the majority of cases all three components (nervous, mechanical and gastric) play a part, with one of them predominating. He directs attention to a mechanical factor; namely, to curvatures of the spine, which exert pressure on certain parts of the stomach and thereby lead to the development of ulcers. He reviews the observations of others, particularly of Hitzenberger, who found twelve cases of round ulcer in the gastroduodenal segment in persons with an abnormal spine. The most frequent anomalies of the lower thoracic and the lumbar portions of the spine are hypernormal lordosis and left-sided scoliosis. It was found that in cases of lordosis the ulcer is usually in the pyloric part, whereas in cases of left-sided scoliosis the niche is in the center of the small curvature. Since Hitzenberger called attention to this in 1920, the author has observed numerous cases of ulcer in patients with considerable lordosis or with left-sided scoliosis of the lower thoracic spine. In all cases the course of the disorder was extremely slow and there never resulted a complete cure. It is noteworthy that the ulcer was localized exactly at the sites at which the apex of the convexity of the vertebral column crossed the small curvature or the pyloric part of the stomach. The author reports the clinical histories of three patients and shows diagrams of the anatomic conditions. He points out that these clinical observations support the mechanic-functional theory of the pathogenesis of gastric ulcer.

Monatsschrift f. Geburtshülfe u. Gynäkologie, Berlin

100: 297-356 (Nov.) 1935

Thoracopagus of Earliest Embryonal Development in Tubal Pregnancy. B. Ottow.—p. 297.
*Pregnancy in Essential Hypertension. H. Albrecht.—p. 301.
Syphilis Reaction in Capillary Blood Suited for Consultation Hour and for Care of Pregnant Women. H. Schwalm.—p. 311.
Case of Successfully Operated Teratoma of Sacrum. K. Fuge.—p. 317.
Blood Formation and Clinical Course of Anemias During Pregnancy. M. A. Daniachi.—p. 328.

Pregnancy and Essential Hypertension.—Albrecht points out that, although it has been asserted that in women with primary hypertension pregnancy takes an uneventful course, his observations on five women convinced him that the prognosis is rather grave. The women observed by him developed a severe edemonephrotic and eclamptic syndrome during the early months of pregnancy. He points out that essential hypertension is considered a change in the tonus of the sympathetic nervous system in the form of a defective regulation of the blood pressure. It is to be expected that the great metabolic changes that take place in the pregnant organism influence the sympathetic nervous system, particularly the vasomotors, and, if essential hypertension is really a neurogenic vasoconstriction of the arterioles, it is understandable that the organism becomes severely taxed. Certain substances that develop in the course of pregnancy result in an increased vasoconstriction of the arterioles and the capillaries. The author gives the histories of the five women and shows that in all of them a tendency to edema formation developed during the early stages, the hypertension increased and renal impairments occurred that finally produced the preeclamptic syndrome or severe eclampsia. The symptoms recur with greater intensity in every subsequent pregnancy and it is therefore necessary to keep such women under careful observation and to institute the required prophylactic treatment. If necessary, the patients should be hospitalized and given a rest cure, but even if they stay at home they should rest in bed and should be carefully guarded against all excitements. The intake of meat and of sodium chloride should be restricted, and even milk and cheese, on account of their high salt content. The medicinal treatment should consist of the administration of calcium, eventually together with atropine and theobromine. Glandular therapy is not advisable. If albumin appears in the urine, rest in bed becomes absolutely necessary and the protein, sodium chloride and water intakes must be restricted. In case of severe edema, thirst days must be intercalated. If the preeclamptic symptoms increase in spite of these measures and if amaurosis and retinitis develop, delivery by cesarean section is indicated.

Zeitschrift für Krebsforschung, Berlin

43: 1-86 (Nov. 18) 1935

*Measurement of Nuclei and Counting of Chromosomes in Human Tumors. E. Schairer.—p. 1.
Nuclear Conditions in Cutaneous Carcinomas. K. Deuticke.—p. 39.
Method for Testing Substances for Their Efficacy in Carcinoma. B. Lustig and H. Wachtel.—p. 54.
Morphologic Structure of Tumor in Relapses of Cervical Carcinoma Following Roentgen-Radium Treatment. W. W. Ossinskaja.—p. 66.

Counting of Chromosomes in Human Tumors.—Schairer points out that an enlargement of the entire cell or of some parts of the nucleus or an increase in the number of these parts has long been considered a characteristic of the cancer cell. He reviews some of the literature on this problem and describes his own measurements on nuclei and his studies on the number of chromosomes. He measured the nuclei of normal organs, adenomas and carcinomas. In the normal human mammary gland he observed rhythmic growth of the gland lobules and especially a nuclear enlargement in the form of rhythmic growth during pregnancy and lactation and in the case of cystic fibrosis. The standard nuclear volume of adenomas in the liver, thyroid or mammary gland revealed no regular deviation from that of the matrix tissue; frequently the two were the same. Rhythmic growth was occasionally observed in adenomas, and it occurs even in carcinomas. The standard nuclear volume of carcinomas was never smaller than that of the matrix tissue.

Occasionally it was of the same size as that of the matrix cells, but in most cases it was larger. The enlargement of the carcinoma cells in comparison to the matrix cells (studied on twenty-five mammary cancers) develops in two ways: (1) by duplication or quadruplication of the standard nuclear volume in the form of rhythmic growth, and (2) by simple upward displacement. Often both ways contribute to the enlargement. An attempt was made to classify mammary carcinomas according to their standard nuclear volume and two groups were set apart, of which one seems to develop from the other one by rhythmic growth. Counting of the chromosomes in cancers of the human skin and of the human mammary gland revealed, in addition to diploid and tetraploid numbers, also values that lay between these extremes. The author concludes that the pathogenesis and the nature of cancer cannot be explained by the doubling of the standard nuclear volume and of the number of chromosomes. He demonstrates parallels between chromosome numbers and size of mitoses on the one hand, and variation curves of the size of the nucleus and standard nuclear volumes on the other hand, and he calls attention to the "harmony in cancer." Every cancer appears to be a special individual, the peculiarities of which must be examined. In this manner it might be possible to find new therapeutic methods.

Sovetskaya Vrachebnaya Gazeta, Leningrad

Oct. 30 (No. 20) pp. 1561-1640, 1935. Partial Index

*New Method of Treatment of Diabetes. G. P. Sacharov and D. M. Rossiyskiy.—p. 1565.
Prophylaxis of Recurrences of Pernicious Anemia. S. I. Sherman.—p. 1573.
Serum Prophylaxis of Measles. A. V. Pshenichnov and B. I. Raykher.—p. 1579.
Incidence and Therapy of Gas Gangrene in Peace Time. K. I. Egorova.—p. 1592.
Thermo-Electro Massage. L. E. Rotenberg.—p. 1598.

Treatment of Diabetes Mellitus.—The method described by Sacharov and Rossiyskiy consists of daily subcutaneous injections of serum of sheep immunized by injections of pancreatic tissue removed from recently deceased human beings. The therapeutic substance is a cytotoxin, to which the authors gave the name of pancreotoxin. The activity of the serum and the presence in it of the cytotoxin are determined by the reaction of complement deviation. Observations were made on twenty-five patients suffering from diabetes. Some of the patients had chronic diabetes with a high blood sugar content, pronounced glycosuria and acetonuria. On the basis of their observations the authors conclude that the use of pancreotoxin produces a definite therapeutic effect in patients suffering from diabetes mellitus. This effect is made manifest by improvement in the general condition and working capacity, and by disappearance of thirst and polyuria. They have noted prompt disappearance of sugar from the urine and lowering and frequently a return to normal of the blood sugar. They have demonstrated in these patients an increase in carbohydrate tolerance. The injections were not followed by unpleasant concomitant manifestations, such as are seen after the injection of insulin. A course of treatment consisted of from fifteen to forty daily subcutaneous injections of from 0.1 to 0.2 cc. of serum containing pancreotoxin. Urine and blood analyses showed absence of glycosuria and normal blood sugar content two months after the course of treatment.

Finska Läkaresällskapets Handlingar, Helsingfors

77: 589-649 (Oct.) 1935

Pernicious Anemia in Light of Liver Therapy. F. Saltzman.—p. 589.
Congenital Word-Blindness and Similar Disturbances During School Age. T. Brander.—p. 601.
*Contribution to Knowledge of Diffuse Polyposis of Large Intestine. T. G. Nyström.—p. 619.

Diffuse Polyposis of Large Intestine.—Nyström describes seven cases of polyposis of the rectum and colon. Resection of the sigmoid and descending colon gave good results in one instance; on after-examination four years later the patient was well. Four died from cancer of the rectum. He calls attention to the tendency of the disturbance to malignant transformation and to the noticeable hereditary disposition. His third and fourth cases were in brothers, likewise his fifth and sixth. In his opinion only radical surgery affords prospects of satisfactory results.

Hospitalstidende, Copenhagen

78: 1181-1192 (Nov. 12) 1935

*Pernicious Anemia and Myxedema. S. A. Holbøll.—p. 1181.
Acetylcholine Treatment in Epilepsy Together with Remarks Concerning Phenobarbital Treatment. O. J. Nielsen.—p. 1186.

Pernicious Anemia and Myxedema.—Holbøll reports three personal cases of simultaneous myxedema and pernicious anemia. According to Baldridge and Greene, reports of only five cases have been published previously. The differential diagnosis of pernicious anemia in myxedema has been possible only since the discovery of the specific therapy for pernicious anemia, and it must be borne in mind that the anemic conditions frequently seen in myxedema not only may be due to a simple chromatic anemia or one of the more infrequent hyperchromatic pernicious-like anemias but may be an essential pernicious anemia which reacts to liver and stomach treatment.

Norsk Magasin for Lægevidenskapen, Oslo

96: 1153-1248 (Nov.) 1935

*Septicopyemias Due to Bacillus Funduliformis. A. Lemierre.—p. 1153.
Simple Free Bodies in Elbow Joint: Constitutional and Purely Traumatic. H. Støren.—p. 1167.
*Sedimentation Reaction in Cerebral Tumor. D. Abrahamsen.—p. 1181.
*Metastatic Pararenal Abscesses. R. Steinert.—p. 1185.
Local Rise of Temperature in Inflammation Focus. A. Scheel.—p. 1200.
Kinescopy—Objective and Subjective: Practical Subjective Kinescope. S. Holth.—p. 1209.
Some Roentgen Results on After-Examination Following Reposition of Luxations of Hip Joint. A. Wolff.—p. 1216.
Hematoporphyria: Case. J. Torgersen.—p. 1223.
Typhoid Epidemic in Lørenskog in Spring of 1935. M. Tesdal.—p. 1229.

Septicopyemias Due to Bacillus Funduliformis.—Lemierre says that these septicopyemias occur most often in persons from 20 to 30 years of age, though there have been instances in persons past 40. The onset of an angina and especially of a tonsillar or peritonsillar phlegmon followed by an intense chill on the fourth or fifth day of the angina, with recurring chills and the development of painful pulmonary infarcts, suggests septicemia due to Bacillus funduliformis. Articular foci of suppuration appear, and jaundice is a frequent manifestation; in cases without jaundice there is a marked urobilinuria. Certain diagnosis depends on finding Bacillus funduliformis in the blood or in the pus from the secondary pleural or articular localizations. While recovery is possible, the prognosis is extremely grave. Death may occur after from seven to twelve or fifteen days, or after from three weeks to two months or longer. Of the seventeen cases reported in France or personally observed by the author, fourteen were fatal. Subcutaneous injections of morphine hydrochloride seem to him to be indicated and were used with good results in his last two cases. The pleural, articular or superficial suppurations are incised and drained.

Sedimentation Reaction in Cerebral Tumor.—On the basis of his study of 132 certain cases of cerebral tumor, in which rise of temperature or other possible causes that might affect the sedimentation reaction were excluded, Abrahamsen asserts that a pathologic sedimentation reaction cannot at present be considered significant in the differential diagnosis between cerebral tumor and infectious intracranial disorders.

Metastatic Pararenal Abscesses.—Steinert states that metastatic pararenal abscesses occur most often in men between 20 and 40 years of age, far less often in women, occasionally in the aged, and in children less than 1 year of age. The two sides are equally often affected; bilateral disturbance is extremely rare. Staphylococcus aureus or albus is most frequently found, sometimes streptococci are seen, seldom Bacillus coli-communis, and in exceptional cases pneumococci and other bacteria; at times the pus is sterile, in which case there is often tuberculosis. Mistaken diagnosis is common. Roentgen examination of the kidney region may show an immobilized and high diaphragm and, in more advanced cases, an enlarged kidney shadow. Initial pain in the affected region is rarely absent and, together with later results on palpation, constitutes the most important symptom of pararenal abscess. Treatment consists of drainage through lumbar incision as in nephrectomy. The abscess may be located at the upper or lower pole, less often perirenally. With timely intervention the prognosis is good. Fifteen cases are reported. Nine patients were male and six female, and the ages ranged from 16 to 59.